PB90-138314

Superfund Record of Decision (EPA Region 9): Coalinga Asbestos Mine Fresno County, California (First Remedial Action), July 1989

(U.S.) Environmental Protection Agency, Washington, DC

19 Jul 89

U.S. Department of Commerce
National Technical Information Service
NTIS

PB90-138314

United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R09-89/036
July 1989

EPA

Superfund Record of Decision:

Coalinga Asbestos Mine, CA

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First Remedial Action

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16. Abstract (Limit: 200 words)

The Coalinga Asbestos Mine site is in Fresno County, California, and is being remediated concurrently with the Atlas Asbestos Mine site. This Record of Decision (ROD) does not address the mines, but rather a separate area in the city of Coalinga, where asbestos, from the Atlas-Coalinga mines, was deposited to await handling and shipment. This 107-acre site has been designated as the first operable unit for the Atlas Asbestos Mine and the Coalinga Asbestos Mine sites. From the 1960s to the mid-1970s extensive asbestos mining and milling took place in areas near the site, and until 1980 the site operated as an asbestos milling, manufacturing, storage, and transportation center. The site consists of four distinct areas: (1) the warehouse which was once a mining waste distribution center and which currently houses 1,600 cubic yards of mining waste; (2) a storage yard which contains asbestos-contaminated stacked pipes; (3) a shipping yard which was used as an asbestos distribution center by the Coalinga Asbestos Company; and (4) the U.S. Coalinga Company which currently stores piles of asbestos-contaminated mining waste. In 1980 a State inspection revealed elevated levels of asbestos in the nearby aqueduct which suggested that the Coalinga Asbestos Mine and Atlas Asbestos Mine sites were probable asbestos sources. Subsequent sampling programs, conducted between 1983 and 1987, revealed that surface water and air also contained elevated levels of asbestos. (See Attached Sheet)

Con't on pg 11

17. Document Analysis a. Descriptors
Record of Decision - Coalinga Asbestos Mine, CA
First Remedial Action
Contaminated Media: soil, debris
Key Contaminants: metals (nickel), other inorganics (asbestos, mining wastes)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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(See ANSI-Z39.18)

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EPA/ROD/R09-89/036
Coalinga, CA
First Remedial Action - Final

con't from PS1

16. Abstract (continued)

As a result of these findings, EPA issued an Administrative Order to a major landowner, Southern Pacific Transportation Company (SPTC), requiring SPTC to conduct an additional remedial investigation and a feasibility study and to perform interim measures to stabilize the site. Because airborne emissions of asbestos pose the greatest threat to neighboring residents, this remedial response will limit the amount of asbestos and nickel released from the soil and emitted into the air. The primary contaminants of concern affecting the soil and debris are metals including nickel, and other inorganics including asbestos and mining wastes.

The selected remedial action for this site are includes excavating and consolidating 14,500 cubic yards of asbestos, chromium, and nickel-contaminated soil and building debris; soil; constructing an underground waste management unit (WMU) to contain and dispose of contaminated soil and waste onsite; capping the WMU area; regrading the excavated area; decontaminating debris; monitoring soil moisture content, ground water, air, and personnel; and implementing institutional controls. The estimated present worth cost for this action ranges between $1,500,000 to $2,500,000, which includes annual O&M costs of $35,000.

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CITY OF COALINGA OPERABLE UNIT
OF THE
ATLAS MINE AND JOHNS-MANVILLE COALINGA ASBESTOS MINE AND MILL NPL SITES

RECORD OF DECISION

United States Environmental Protection Agency
Region IX - San Francisco, California
July 19, 1989

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RECORD OF DECISION

DECLARATION

SITE NAME AND LOCATION

City of Coalinga Operable Unit
Fresno County, California

STATEMENT OF BASIS AND PURPOSE

This Record of Decision ("ROD") presents the selected remedial action for the City of Coalinga Operable Unit, in Fresno County, California. The remedy was selected pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act, 42 U.S.C. Section 9601 et. seq., ("CERCLA") and in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. Section 300 et. seq., ("NCP"). This decision is based on the Administrative Record for this Operable Unit. The attached index identifies the items that comprise the Administrative Record.

The State of California has concurred in the selection of this remedy. See Administrative Record Doc. # 1066.

THE SITE

The response action selected in this ROD addresses actual or threatened releases of hazardous substances from the City of Coalinga Operable Unit that may present an imminent and substantial endangerment to public health, welfare, or the environment. During remedial investigations for the Atlas Mine Superfund Site and the Johns-Manville Coalinga Mill Superfund Site (the "Atlas-Coalinga Superfund Sites" or the "Mine and Mill Sites"), it was discovered that asbestos had been transported from the mines and mills to an area within the City of Coalinga for eventual handling and shipment. Soil sampling confirmed the presence of uncontrolled hot spots of asbestos and nickel contamination over the 107 acre area in Coalinga (the "Site"). An outline of the Site can be found at Figure 1A.

On August 24, 1987 the Environmental Protection Agency ("EPA") issued Order No. 87-04 to the Southern Pacific Transportation Company ("SPTC") pursuant to CERCLA Section 106. Order No. 87-04 required SPTC to take emergency containment actions at the Site to reduce the threat to public health from nickel and asbestos dust that could enter the air from contaminated soils. Pursuant

6

Areas at the Site, including warehouses, storage yards and shipping yards, contain asbestos-bearing soils, equipment and waste piles. Analysis of soil and waste pile samples using polarized light microscopy ("PLM") shows the asbestos levels ranging from one area percent (the detection limit) to as high as 98 area percent. Chromite ore waste and soil samples were also analyzed for heavy metals. These analyses indicated that the Soluble Threshold Limit Concentration ("STLC") for the heavy metal nickel, as specified in Title 22 of the California Administrative Code, was exceeded in some of the samples that tested positive for asbestos.

Asbestos and nickel are hazardous substances as defined in 42 U.S.C. § 9601(14) and as listed in 40 C.F.R. § 302.4. Asbestos is a known human carcinogen and has been shown to cause lung cancer and mesothelioma. Asbestos also causes other lung diseases, such as asbestosis. Nickel is a potential human carcinogen that can affect the lungs, nasal cavities, and skin. If asbestos and nickel remain uncontrolled at the Site, the potential for human exposure to asbestos and nickel and the resulting increased risk to human health, primarily through the inhalation pathway, will remain.

EPA is undertaking additional Remedial Investigations/Feasibility Studies ("RI/FS") to evaluate remedial action alternatives for the Mine and Mill Superfund Sites and will select remedies for those Sites in separate Record of Decision documents.

DESCRIPTION OF THE SELECTED REMEDY

The remedial action selected for the Site in this ROD is containment of the asbestos- and nickel-contaminated materials in an underground vault. This remedy entails:

1) The removal and consolidation of the asbestos- and nickel-contaminated soils at this Site that: (a) exceed one area percent asbestos using polarized light microscopy ("PLM"), (b) display the light-grey coloring characteristics of asbestos contaminated soils and/or (c) contain nickel at levels in excess of background. Areas displaying light-grey coloring will be remediated until no light grey color is visible and only light brown soil remains, by visible inspection; confirmation will be by 1 area percent PLM.

2) Removal and consolidation of waste materials and equipment that exceed the levels set forth in paragraph 1, immediately above.

3) Decontamination of buildings to less than or equal to one percent by PLM.

4) Construction of an underground, on-site Waste Management Unit to bury permanently the consolidated contaminated substances under an impermeable cap. The impermeable cap will consist of a compacted soil foundation layer overlain by an impermeable clay mat, covered by a second soil layer.

5) Use of strict dust control measures to limit the release of asbestos fibers from the Site during the Remedial Action work.

6) Confirmation sampling to ensure achievement of the clean-up standards.

7) Ground-water monitoring and continuous monitoring of soil moisture content using neutron probes.

8) Regrading of areas where contaminated soils have been removed.

9) Placement of deed restrictions on the Site property where the Waste Management Unit and soil cover exist, to prevent the disturbance of the cap and possible release of asbestos fibers or nickel contaminants.

The permanent burial of material contaminated with asbestos and nickel in the Waste Management Unit will minimize the release of asbestos and nickel, thus providing long-term protection of human health and the environment. The estimated cost of the selected remedial action is $2,500,000.

Operation and maintenance activities will be required to ensure the effectiveness of the response action. These activities include: (1) quarterly visual inspections to ensure the integrity of the cap for three years with annual visual inspections thereafter, and (2) any repair work necessary to maintain the integrity of the cap, including maintenance of vegetation, 3) ground water monitoring well(s), and 4) monitoring of soil moisture content using neutron probes. In the event of a natural event such as a flood or earthquake, all repairs necessary to contain the hazardous substances will be made. EPA will perform a review of the remedial action pursuant to CERCLA Section 121(c).

STATUTORY DETERMINATIONS

Pursuant to CERCLA Section 121, 42 U.S.C. § 9621, and in accordance with the NCP, the selected remedy for the City of Coalinga Operable Unit: (1) is protective of human health, welfare, and the environment; (2) meets the applicable and relevant and appropriate environmental requirements; and (3) is cost effective. The selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site. Treatment of the asbestos contamination in the City of Coalinga Operable Unit was determined to be impracticable based on effectiveness, technical feasibility, implementability and cost factors. The reasons for this determination are further elaborated herein, and a thorough discussion of these factors may be found in the Operable Unit Feasibility Study for this Site. While treatment to reduce permanently and significantly the mobility, toxicity and volume was found to be impracticable, the remedy is designed to protect the public and environment on a permanent basis through continued monitoring and, if necessary, maintenance.

This remedy will result in hazardous substances remaining on Site above health-based levels. Pursuant to CERCLA Section 121, 42 U.S.C. Section 9621, EPA will conduct a review at five year intervals, beginning after commencement of remedial action, to ensure that the remedy continues to provide adequate protection of human health and the environment.

Harry Seraydarian
for Daniel W. McGovern
Regional Administrator
EPA Region IX

7/19/89
Date

RECORD OF DECISION

DECISION SUMMARY

1.0 SITE LOCATION AND DESCRIPTION

The City of Coalinga is located in Pleasant Valley near the confluence of two intermittent streams, Warthan Creek and Los Gatos Creek, which are part of the Arroyo Pasajero Drainage Basin. The Arroyo Pasajero watershed and adjacent Cantua Creek watershed are located on the western margin of the central San Joaquin Valley in an area that includes the foothills of the Southern Diablo Range Mountains to the west and a system of coalescing alluvial fans (including the Arroyo Pasajero fan and Cantua fan) to the east. Approximately 20 miles northwest of Coalinga, in the Diablo Range, is the New Idria Formation. This elliptically shaped rock formation covers approximately 48 square miles and is the largest known serpentine deposit in the Coalinga region. The southeastern third of the New Idria Serpentine Mass (or New Idria Formation) has been the locus of significant mining and surface mineral exploration. These activities have included successful exploration and mining for chromite ore and chrysotile asbestos ore as well as for other serpentine related minerals. Cattle ranching and oil exploration and production are the other main natural resource activities in the Coalinga area.

In September, 1984, an asbestos mine located in the New Idria Formation and a mill located immediately southeast of the Formation were listed on the Superfund National Priorities List as the Atlas Mine and Superfund Site and the Johns-Manville Coalinga Asbestos Mill Superfund Site (the "Atlas-Coalinga Sites" or the "Mine and Mill Sites"), respectively. During investigation of these Mine and Mill Sites, it was discovered that asbestos had been transported from the mines and mills to an area within the City of Coalinga for eventual handling and shipment. Soil sampling confirmed the presence of uncontrolled hot spots of asbestos and nickel contamination over a 107 acre area (the "Site") in the City of Coalinga, California.

The Site is located in a mixed use, industrial and residential area. The Site boundary extends approximately one mile from Fourth Street on the northern end of Coalinga to its southern border, near the intersection of Lucille Avenue and Highway 198. The east-west borders are between Glenn and Forest Streets in the northern section, fanning out to Highway 198 for the western border and approximately 900 feet in an easterly direction for the eastern border. Figure 1A is an outline of the Site boundaries; Figure 1B shows the location of the Site in relation to the Mine and Mill Sites.

The contaminated areas at the Site connected to the Atlas Mine Site are at the northern end of the Site, while the contaminated areas connected to the Johns-Manville Mill Site are at the

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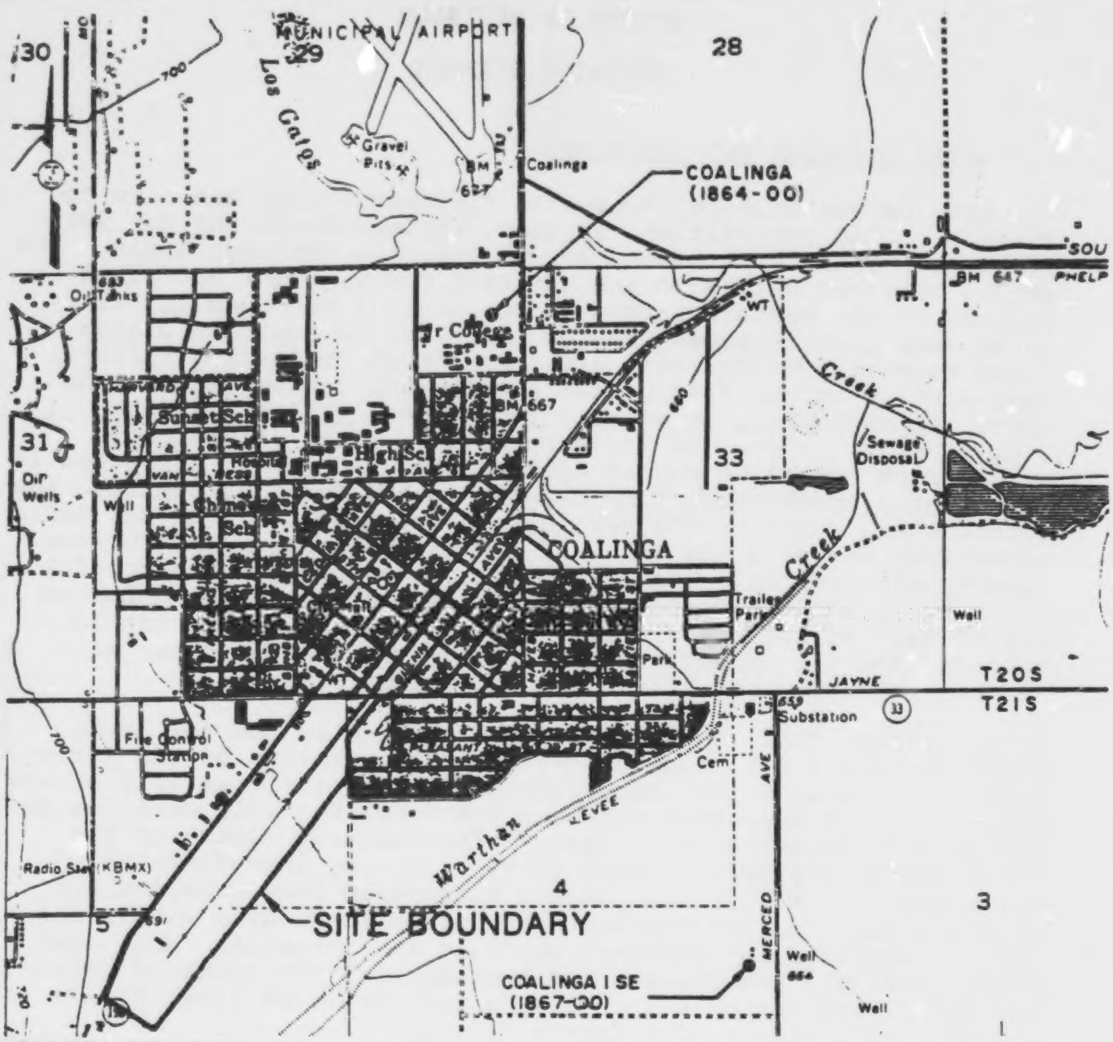

MUNICIPAL AIRPORT
30
29
28
Los Gatos
Gravel Pits
BM 627
Coalinga
COALINGA
(1864-00)
SOU
BM 647
PHELP
663
Oil Tanks
Jr College
BM 667
WT
Creek
Sunset Sch
High Sc
Hospital
31
Oil Wells
Well
Sch
33
Sewage Disposal
COALINGA
Creek
Trailer Park
Well
Park
JAYNE
T20S
T21S
659
Substation
33
Fire Control Station
Cem
AVE
LEVEE
Warthan
Radio Sta (KBMX)
4
3
5
SITE BOUNDARY
COALINGA I SE
(1867-00)
MERCED
Well
664
Well
700

EXPLANATION:

● (1867-00) STATION NAME (DWR STATION NUMBER)

SCALE

0 2000 4000 FEET

CONTOUR INTERVAL = 20 FEET

FIGURE 1A

SITE LOCATION

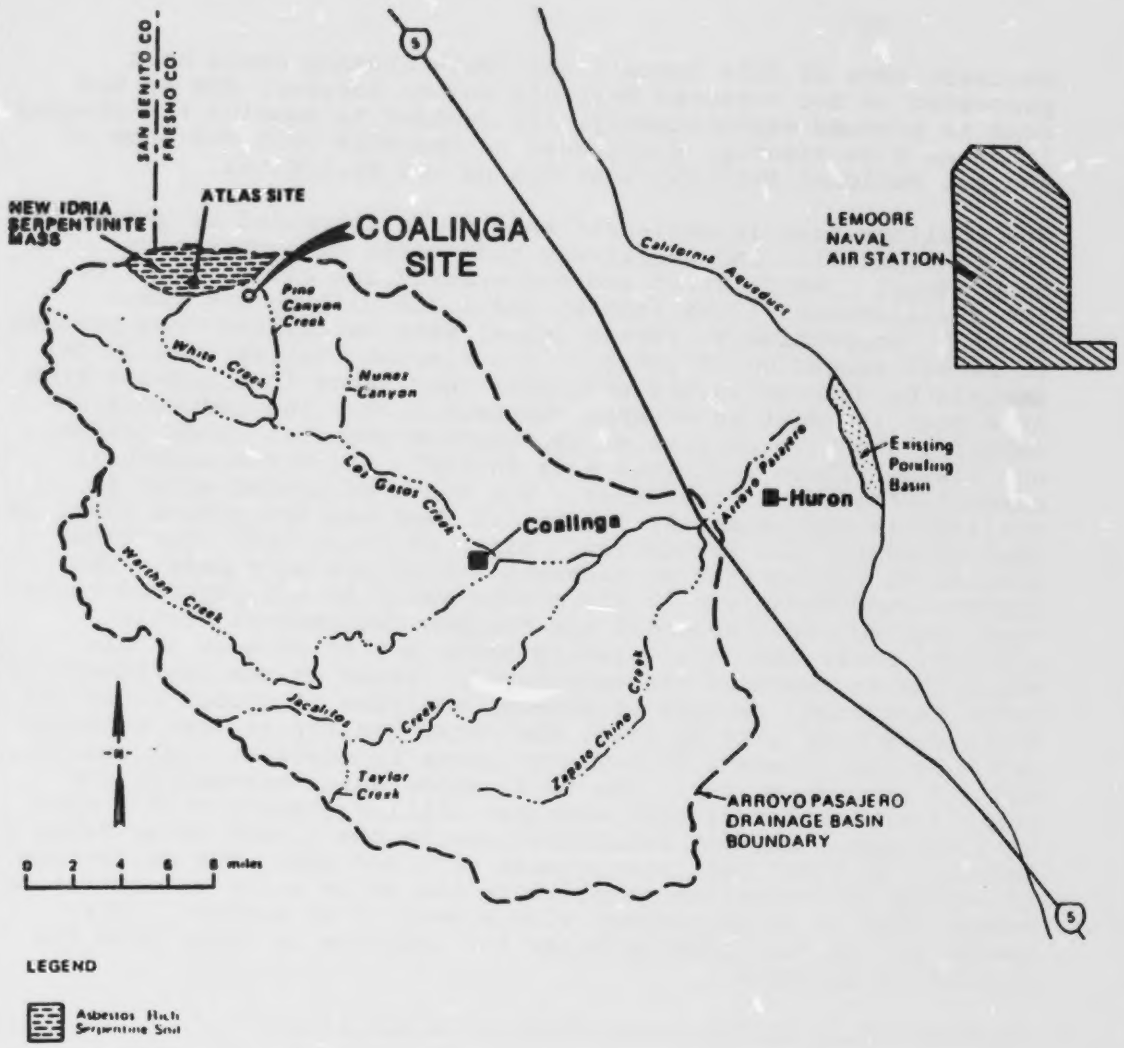
COALINGA SITE

REFERENCE:

USGS 7.5 MINUTE TOPOGRAPHIC
MAP OF COALINGA, CALIFORNIA
QUADRANGLE, DATED 1956
PHOTOREVISED 1979
SCALE: 1:24000

137773

"Do Not Scale This Drawing


SAN BENITO CO.
FRESNO CO.
NEW IDRIA SERPENTINITE MASS
ATLAS SITE
COALINGA SITE
5
California Aqueduct
LEMOORE NAVAL AIR STATION
Pine Canyon Creek
White Creek
Nunes Canyon
Los Gatos Creek
Coalinga
Arroyo Pasajero
Huron
Existing Ponding Basin
Warthan Creek
Jacalitos Creek
Zapato Chino Creek
Taylor Creek
ARROYO PASAJERO DRAINAGE BASIN BOUNDARY
N
0 2 4 6 8 miles
LEGEND
Asbestos Rich Serpentine Soil

REFERENCE:

DRAWING BY
WOODWARD-CLYDE CONSULTANTS

FIGURE 1B

COALINGA SITE

PROJECT NAME

SITE LOCATION
IN RELATION TO MINE SITES

southern edge of this large Site. This cleanup could have proceeded as two separate Operable Units; however, due to the need to proceed expeditiously, EPA decided to combine the cleanup into one Site cleanup, designated an Operable Unit for each of the two National Priority List Mining and Mill Sites.

The Coalinga area is semi-arid and is characterized by moderately low precipitation and relatively high rates of evaporation. The mean annual precipitation and evaporation are estimated to be 189.6 millimeters (7.46 inches) and 2,253 millimeters (88.7 inches), respectively. (These values were calculated from periods of record exceeding 15 years). The Pleasant Valley area is underlain by unconsolidated sediments that range in thickness from less than 100 feet to several thousand feet. The sediments underlying the Site consist of interbedded gravels, sands, silts and clays. These sediments have markedly different hydraulic conductivities and porosities. The depth to ground water in Coalinga is approximately 100 to 150 feet and the ground water is used primarily for irrigation. Since at least 1951, the water quality of the aquifer in Pleasant Valley has been poor. The sulfate concentrations in the ground water in all reported wells near Coalinga have exceeded the Maximum Contaminant Levels ("MCLs") under the Safe Drinking Water Act by as much as six times the recommended concentrations. Based on the Department of Water Resources' records of mineral analyses of ground water for the period from 1978 to 1985, the water quality of four selected wells in the Pleasant Valley area shows moderate to high sodium-sulfate concentrations. The total major anion concentrations range from 1,100 to 2,600 parts per million ("ppm") with a mean of 1,700 ppm. Sulfate concentrations in the ground water range from 660 to 1,900 ppm, with a mean of 1,300 ppm. The percentage of sodium concentration relative to the major anion concentration ranges from 45 to 53 percent with a mean of 49 percent. Virtually all of the drinking water for Coalinga is drawn from the California Aqueduct.

Description of Contaminated Structures and Areas

The Site has been divided into the following four areas, based on existing structures and geography (see figure 3):

1) The Marmac Warehouse: The warehouse is located on Elm Avenue (Highway 198) in the southwest section of Coalinga. This area was a chromite ore distribution center and currently houses approximately 1,600 cubic yards of chromite ore waste and other materials contaminated with asbestos.

2) The Storage Yard: This yard is located approximately one mile south of the Marmac Warehouse on Elm Avenue on the east side of the road. The storage yard contains stacked pipes that are contaminated with asbestos.

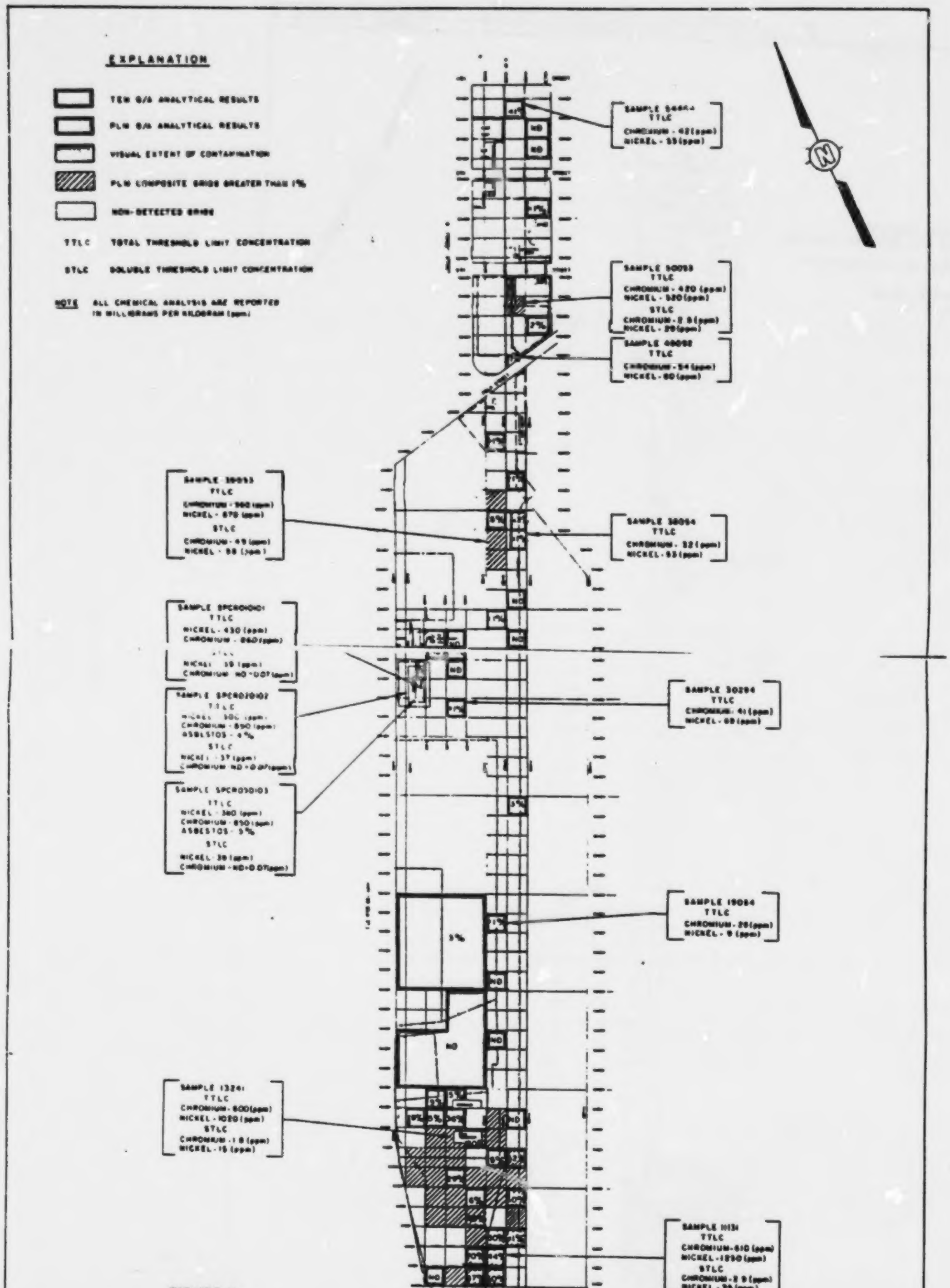

EXPLANATION
TEM Q/A ANALYTICAL RESULTS
PLM Q/A ANALYTICAL RESULTS
VISUAL EXTENT OF CONTAMINATION
PLM COMPOSITE GRIDS GREATER THAN 1%
NON-DETECTED GRIDS
TTLC TOTAL THRESHOLD LIMIT CONCENTRATION
STLC SOLUBLE THRESHOLD LIMIT CONCENTRATION
NOTE ALL CHEMICAL ANALYSIS ARE REPORTED IN MILLIGRAMS PER KILOGRAM (ppm)
N
SAMPLE 54064
TTLC
CHROMIUM - 42 (ppm)
NICKEL - 55 (ppm)
SAMPLE 50093
TTLC
CHROMIUM - 420 (ppm)
NICKEL - 520 (ppm)
STLC
CHROMIUM - 2.9 (ppm)
NICKEL - 29 (ppm)
SAMPLE 49092
TTLC
CHROMIUM - 54 (ppm)
NICKEL - 80 (ppm)
SAMPLE 39053
TTLC
CHROMIUM - 960 (ppm)
NICKEL - 870 (ppm)
STLC
CHROMIUM - 49 (ppm)
NICKEL - 58 (ppm)
SAMPLE 38054
TTLC
CHROMIUM - 32 (ppm)
NICKEL - 53 (ppm)
SAMPLE SPCR010101
TTLC
NICKEL - 430 (ppm)
CHROMIUM - 860 (ppm)
STLC
NICKEL - 39 (ppm)
CHROMIUM - ND - 0.07 (ppm)
SAMPLE SPCR020102
TTLC
NICKEL - 500 (ppm)
CHROMIUM - 890 (ppm)
ASBESTOS - 4%
STLC
NICKEL - 37 (ppm)
CHROMIUM - ND - 0.07 (ppm)
SAMPLE SPCR030103
TTLC
NICKEL - 380 (ppm)
CHROMIUM - 850 (ppm)
ASBESTOS - 5%
STLC
NICKEL - 38 (ppm)
CHROMIUM - ND - 0.07 (ppm)
SAMPLE 30294
TTLC
CHROMIUM - 41 (ppm)
NICKEL - 68 (ppm)
SAMPLE 19084
TTLC
CHROMIUM - 26 (ppm)
NICKEL - 9 (ppm)
SAMPLE 13241
TTLC
CHROMIUM - 600 (ppm)
NICKEL - 1020 (ppm)
STLC
CHROMIUM - 1.8 (ppm)
NICKEL - 15 (ppm)
SAMPLE 11131
TTLC
CHROMIUM - 610 (ppm)
NICKEL - 1290 (ppm)
STLC
CHROMIUM - 2.9 (ppm)
NICKEL - 39 (ppm)
ND
5%
3%
1%

FIGURE 2

SITE PLAN WITH
SUMMARY OF CONTAMINATED AREAS
IT CORPORATION
COALINGA SITE

REV. 1
2-2-89

REV. 1
2-07-89

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	11-7-88	APPROVED BY			

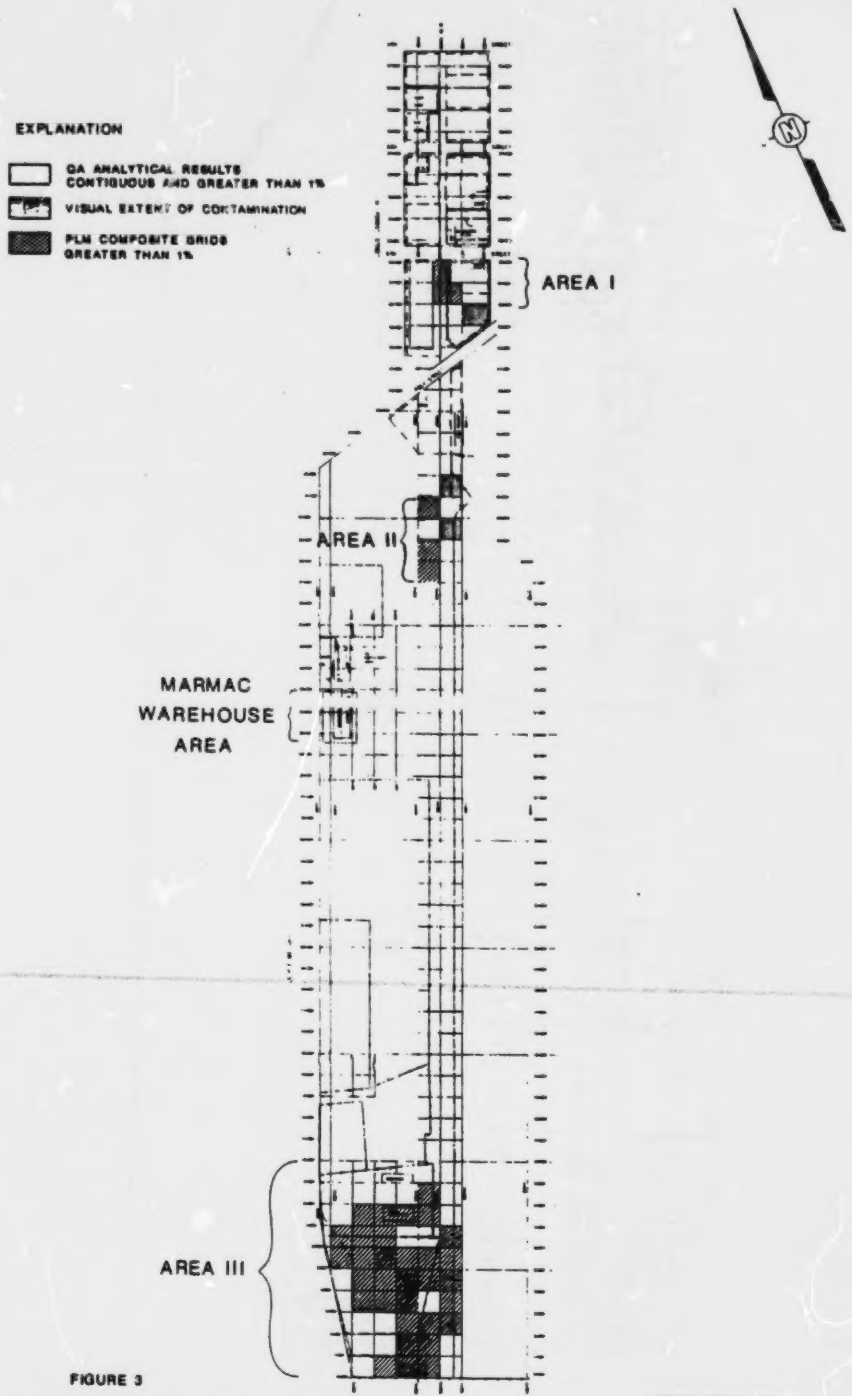
EXPLANATION
QA ANALYTICAL RESULTS CONTIGUOUS AND GREATER THAN 1%
VISUAL EXTENT OF CONTAMINATION
PLM COMPOSITE GRIDS GREATER THAN 1%
N
AREA I
AREA II
MARMAC WAREHOUSE AREA
AREA III

FIGURE 3

SUMMARY OF CONTAMINATED
AREAS TO BE REMEDIATED
IT CORPORATION
COALINGA SITE

3) The Atlas Shipping Yard: This yard is located in the vicinity of Glenn Avenue and 6th Street. It was used as an asbestos distribution center by the Atlas Asbestos Company.

4) The U.S. Asbestos Company: This area is located at the southern border of the Site and encompasses approximately nine acres. Piles of raw asbestos ore are located in this area.

Because of the close proximity of residential areas to the piles of asbestos-containing material, it is important that the remediation proceed as soon as possible.

2.0 SITE HISTORY

In the mid-1950's, an investigation by the California Division of Mines and Geology indicated that the serpentine matrix of the New Idria formation was chrysotile asbestos. Subsequent investigation in the southeastern third of the New Idria Formation demonstrated that the asbestos ore could be mined and milled to produce a marketable short-fiber asbestos product. From 1959 through 1962, the Coalinga and Los Gatos Creek areas experienced an intensive land rush for asbestos mining claims. From the 1960's through the mid-1970's, extensive asbestos mining and milling operations were conducted in the Coalinga and Los Gatos Creek areas. From 1955 to 1980, the Site was the locus of milling, manufacturing, storage and transportation of asbestos-mining materials from the Mine and Mill Sites.

Discovery of the Problem in Coalinga

In early 1980, the Metropolitan Water District ("MWD") of Southern California detected elevated levels of asbestos in water samples from the California Aqueduct. An extensive sampling program along the Aqueduct, conducted by the MWD in August through September of 1980, suggested that the Atlas Mine and the Johns-Manville Mill Sites were probable sources of asbestos in the California Aqueduct. Asbestos levels of up to 2500 million fibers per liter ("MFL") were measured.

On October 17, 1980, the Central Valley Regional Water Quality Control Board ("CVRWQCB") and the California Department of Health Services ("DHS") inspected the Atlas Mine and the Johns-Manville Mill to determine if waste discharges from these facilities were in compliance with state regulations. The CVRWQCB concluded that additional corrective measures should be taken to prevent mine- and mill-generated asbestos from entering the drainage basins.

In March of 1983, the CVRWQCB collected four surface water samples during a period of high run-off in the Arroyo Pasajero watershed. Asbestos fiber concentrations in these samples ranged from 80,000 to 240,000 MFL. On June 14, 1983 the risks represented by the Atlas Mine and the Johns-Manville Coalinga Asbestos Mill were rated using the Hazard Ranking System. The Mining and

Mill Sites were approved for listing on the National Priorities List in September, 1984. Remedial Investigation/Feasibility Studies ("RI/FSs") are ongoing at both of these Sites.

During an airborne asbestos sampling program in 1986 and 1987 conducted as part of the Remedial Investigation and designed to measure airborne emissions from the Mining and Mill Sites, high asbestos readings were measured in the City of Coalinga. Based on this data, a study was initiated to look for possible sources of asbestos in Coalinga. On June 17 and 18, 1987, EPA conducted a limited sampling and analytical program in Coalinga. This study showed chrysotile asbestos occurrence from less than one (1) percent to fifty (50) percent in the area of the Site. Further investigation revealed that a major landowner in the contaminated area was Southern Pacific Transportation Company ("SPTC"). In August of 1987, EPA issued an administrative order pursuant to CERCLA Section 106 (Order No. 87-04) to SPTC, requiring SPTC to conduct a Remedial Investigation at the Site (i.e., an intensive sampling program to identify and quantify sources of mining waste contamination). As a result of the Remedial Investigation, areas contaminated with residual asbestos ore waste have been found throughout the Site. SPTC was also ordered to prepare an Operable Unite Feasibility Study ("OUFS") to develop and evaluate remedial alternatives for the Site. EPA released the OUFS and information concerning EPA's proposed plan for cleanup of the Site on February 9, 1989.

In response to Order No. 87-04, SPTC also performed interim measures to stabilize the waste materials during the more detailed investigation. These tasks included: i) limiting access to contaminated areas with fencing, ii) posting warning signs, iii) spraying biodegradable sealant to control dust emissions, and iv) covering waste ore piles with plastic sheeting. These interim measures were performed in the fall of 1987; a second spraying of sealant took place in the spring of 1988 and a third spraying took place in June of 1989.

3.0 ENFORCEMENT

In the spring of 1988, general notice letters were sent to several Potentially Responsible Parties ("PRPs"), notifying them of their potential liability for the cleanup of the Site. On February 22, 1989, EPA issued notices of negotiations to the PRPs for the City of Coalinga Operable Unit asking for good faith offers. Due to the significant risk to the public health and the environment posed by uncontained hazardous waste in Coalinga, and the immediacy of the threat, EPA determined pursuant to CERCLA Section 122 that clean-up should be completed as soon as possible, and that the discretionary special notice procedures in CERCLA Section 122 should not be invoked. Therefore, PRPs were given 21 days to respond to EPA's request for good faith offers. Negotiations to sign a consent decree are in progress. On May

10, 1989, a general notice letter was sent to the City of Coalinga notifying the municipality of its possible liability in this matter.

4.0 COMMUNITY RELATIONS

The public comment period for the OUFS and the proposed plan opened on February 9, 1989 and closed on March 24, 1989. A public meeting was held on February 22, 1989 at the Coalinga City Council Chambers and was attended by approximately sixty people. Prior to the beginning of the public comment period, EPA published a notice in the Fresno Bee and the Coalinga Weekly Courier. The notice briefly described the proposed plan and announced the public comment period and the public meeting. The notice also announced the availability of the proposed plan and the OUFS for review at the information repository established at the Coalinga Public Library.

A fact sheet describing the proposed plan was delivered to the information repository. Copies of the fact sheet were mailed to the EPA general mailing list for the Atlas Mine and Johns-Manville Coalinga Asbestos Mill Sites, which included approximately 300 members of the general public, elected officials and media representatives. Since June, 1987, EPA personnel have met periodically with members of the Coalinga City Council. Several different persons designated by the City Council to be the Council's contact with EPA have been kept informed about the investigation's status.

EPA has prepared the attached responsiveness summary, which provides responses to the comments submitted in writing during the public comment period, as well as responses to comments made by attendees at the February 22, 1989 public meeting.

5.0 SCOPE AND ROLE OF THE OPERABLE UNIT

The contamination at the Site represents the first operable unit of the Atlas Mine Site and of the Johns-Manville Coalinga Asbestos Mill Sites. The principal threat posed by uncontained asbestos close to residential areas comes from airborne emissions. The purpose of this response is to limit current and future airborne emissions from the asbestos- and nickel-contaminated soils.

The remedial action selected in this ROD addresses a problem specific to a populated area. Asbestos piles in Coalinga are to be removed, consolidated and permanently buried so that airborne emissions of asbestos fibers are minimized. The remediation strategy for this Site is necessarily different from the remediation strategy being considered for the Mine and Mill Sites. Those Sites contain large piles of asbestos ore tailings situated in sparsely populated areas and surrounded by very rich sources of naturally occurring chrysotile asbestos. These different situations require consideration of different factors. The RI/FS for the Atlas Mine Site and Phase 1 of the Johns-Manville

Coalinga Asbestos Mill Site (sampling and data collection) were initiated in July of 1985. The RI/FS for the work remaining on the RI as well as for the complete FS for the Johns-Manville Coalinga Asbestos Mill Site was initiated in November of 1986. The major goal of both RIs is to identify the sources, extent, pathways and receptors of the contaminants and to characterize the nature and extent of the public health and environmental problems presented by the contamination. Major components of the Remedial Investigation Reports include detailed soil, water and air sampling, geological and geotechnical studies and watershed modeling. The Feasibility Studies for these Sites, which will evaluate the necessity for and proposed extent of remedial action, are expected to be completed in the fall of 1989.

6.0 SITE CHARACTERISTICS

Elevated asbestos levels in the air in Coalinga were first discovered during the regional airborne asbestos sampling of 1986 and 1987. The detailed soil sampling performed by SPTC in the site area found levels of asbestos ranging from less than one area percent to as high as 98 area percent (found in raw asbestos ore piles). The composite soil samples were analyzed using Polarized Light Microscopy ("PLM") as described in Interim Method for the determination of Asbestos in Bulk Insulation Samples (EPA-600/M4-82-020). The less than one percent results are those in which the contaminant was present, but was below the level at which the concentration could be determined.

Figures 2 and 3 show the areas within the Site where asbestos contamination was detected. The total affected area is approximately 11 acres and the depth of contamination ranges from several inches to several feet. Asbestos ore waste was identified in a one half acre area adjacent to the Coalinga Machine Company. Samples from this asbestos ore waste ranged from two (2) area percent asbestos to 80 area percent using PLM. Approximately 500 feet south of Polk street is an area of approximately one and one half acres with recorded asbestos levels ranging from one area percent to 46 area percent. On the southern border of the Site is an area of approximately nine acres where piles of raw asbestos ore were identified. One sample from this area measured 98 area percent asbestos. The fenced area around the Marmac Warehouse contains broken pieces of asbestos-containing paneling. Several piles of suspected chromite ore waste are present within the warehouse. The suspected chromite ore waste in the Marmac Warehouse was sampled and analyzed for heavy metals and asbestos contamination. Three samples were analyzed for asbestos and the 17 metals listed in Title 22 of the California Administrative Code. The Title 22 Total Threshold Limit Concentration ("TTLC") for asbestos was exceeded in all samples; the Soluble Threshold Limit Concentration ("STLC") for nickel was exceeded in all samples. Additional samples from asbestos-contaminated areas throughout the Site were analyzed to see if a correlation existed between asbestos content and elevated levels of nickel. These analyses indicate that at any one measuring point within the vadose zone beneath the WMU, the following response will be initiated:

1. The RWQCB will be notified of test results and the elevated area will be retested.

2. After consulting with the RWQCB, a decision will be made as to whether this is an anomalous reading or if a real increase in moisture content has been detected. In the event that the detected increase is real, the following steps will be taken:

    (a) A qualitative assessment of the monitored area will be performed to determine the areal and vertical extent of migration. This assessment will consist of a detailed review of all data collected from the vadose zone monitoring network, background data established at the beginning of monitoring, and a review of the geotechnical and geochemical characteristics of the suspected soils.

    (b) A drilling and soil sampling program will be designed to collect soil samples from the affected areas and laboratory analyses will be performed.

    (c) Laboratory analyses will be performed on archived materials from the same location as the elevated moisture readings.

    (d) Results of the laboratory analyses will be compared for indications of contamination.

    (e) Should the continued neutron probe monitoring still indicate elevated moisture contents, a soil-pore liquid sampler will be installed. In addition, soil-pore liquid samplers will be installed away from the suspect area to provide background data, if the background soils contain sufficient moisture.

3. Upon installation of a soil-pore liquid sampler, samples will be collected for analyses on a quarterly basis and compared to background samples for indications of contamination.

4. If the RWQCB determines that the results of pore fluid sampling indicate contaminant migration which might

endanger groundwater, a monitoring plan, consisting of one upgradient and two downgradient wells, will be submitted to the RWQCB within 90 days.

Comments and Recommendations:

Upon review of the report, I have no objections to SPTC proceeding with the proposed project provided the following items are addressed.

1. Upon completion of the WMU, a report detailing construction should be submitted for our review. The WMU should be inspected by staff prior to its use.
2. Schedule for construction and closure of the WMU, along with a schedule for deposition of waste into the unit, should be provided so staff can schedule periodic inspections.
3. Although groundwater monitoring may be minimized in favor of vadose zone monitoring, a specific groundwater monitoring plan including well placement and construction details will need to be prepared, approved and thereafter implemented. SPTC will also need to develop a groundwater sampling program.
4. The design report does not indicate that all results from vadose zone monitoring will be submitted to our office. The report only indicates that the RWQCB will be contacted if a significant change in moisture content is observed. Results of all monitoring data will be required as soon as they are made available to SPTC.

I recommend that we request SPTC to address the comments and recommendations, as outlined above, prior to construction of the WMU. If modifications are made to this design, these changes will also need to be submitted for our review.

samples which contain greater than one percent asbestos are positively correlated with samples that exceed the STLC for soluble nickel. Nickel is a by-product of asbestos milling processes and is likely to be associated with asbestos ore waste.

Asbestos is a generic term referring to two groups of naturally-occurring hydrated silicate minerals having a fibrous crystalline structure. The asbestos mineral found in the New Idria Serpentine Mass is chrysotile, a fibrous mineral with an elongated, needle-like structure. Chrysotile is a short-fiber asbestos mineral. Asbestos fibers are widely used for their high tensile strength and flexibility and for their noncombustible, nonconducting, and chemical-resistant properties. The fibers have been used in insulation, brake linings, floor tile, plastics, cement pipe, paper products, textiles, and building products.

7.0 SUMMARY OF SITE RISKS

Asbestos is the primary contaminant of concern at the Site. Major sources of asbestos at the Site are contaminated soils and piles of raw asbestos ore waste. Low levels of soluble nickel in some of the asbestos tailings are of secondary concern.

Asbestos is one of the few known human carcinogens. Asbestos exposure can also cause other lung diseases, such as asbestosis. EPA considers carcinogens to be non-threshold in nature, that is, any amount of a human carcinogen in the environment represents a cancer risk to the exposed population. Asbestos has been the subject of numerous epidemiological studies. Exposure to asbestos has been positively linked to asbestosis, lung cancer, and mesothelioma. Also associated with asbestos exposure in some studies are cancers of the larynx, pharynx, gastrointestinal tract, kidney, and ovary, as well as respiratory diseases such as pneumonia. A full discussion of the health effects of asbestos is found in the EPA document Airborne Asbestos Health Assessment Update, June 1986.

Analytical results from air sampling conducted in August, 1986, March, 1987 and September-October 1987, as well as results of soil sampling conducted as part of the OUFS, form the database that were used to qualitatively assess the health risks in Coalinga. Further details of health risks in the Coalinga area related to asbestos are included in the risk assessment chapter in the Remedial Investigations for the Mine and Mill Sites.

There are two general routes of exposure to asbestos at the Site: inhalation and ingestion. Inhalation is the exposure pathway of greatest concern to human health because this pathway has been positively linked to cancer in humans. While not of primary importance, ingestion exposure to asbestos may also be associated with an increased risk of cancer. These ingestion exposures include direct ingestion of soil contaminated with asbestos and indirect ingestion of asbestos which has been inhaled.

Individuals may inhale asbestos fibers which are present in ambient air and asbestos fibers which are entrained into the air as a result of specific activities. Ambient concentrations of asbestos were detected in both on-site and off-site areas by the air monitoring conducted in 1986 and 1987. Soil disturbing activities such as children playing in or bicycle riding on asbestos-contaminated soils can resuspend asbestos fibers into the air. Vehicular traffic on unpaved areas containing asbestos contaminated soils such as truck yards and vacant lots can entrain significant amounts of asbestos into the air. Asbestos fibers stirred up by truck traffic may be inhaled by truck yard personnel and by persons living downwind from the Site. Soil concentrations of asbestos in the Site range from a geometric mean of less than one area percent to 98 area percent.

Experiments conducted by the California Department of Health Services ("DHS") in 1985 clearly show that a pickup truck driving on unpaved asbestos contaminated soil can produce asbestos dust concentrations in the air that pose a potential health risk to an individual at or nearby the activity. A detailed discussion of this experiment is included in the Remedial Investigation Report for the South Bay Asbestos Site, Alviso, California, 1988. The South Bay Asbestos Site Remedial Investigation Report has been included in the Administrative Record for this Site.

When evaluating risk from asbestos in the environment, there are sources of uncertainty associated with asbestos measurement that make quantifying the risk difficult. One of these sources of uncertainty is the difficulty of obtaining accurate and precise measurements of asbestos concentrations in soil, air, and water. For example, all risk assessments require an accurate and precise measurement of contaminant concentration. When a gaseous or soluble chemical is the contaminant of concern, the measurement of only one parameter, concentration, is sufficient to establish how much of that contaminant is present in a given sample. However it is infinitely more complex to measure the concentration of particulates accurately and precisely, especially fibrous particulates, because many more parameters must be accounted for. When measuring spherical particles the following parameters must be measured: i) the overall particle size distribution; ii) the concentration of each individual size category; and iii) the change in concentration of each size category in different parts of a dust cloud. When measuring fibrous particulates such as asbestos, the parameters become exponentially more complex. The length and diameter of each particle must be measured along with the distribution of complex shapes (such as bundles, clusters and matrices). The concentration of each different shape must be established, along with the settling velocity of different fiber shapes. Finally, there is a human component to asbestos analysis. Because all of the sampling methods for asbestos involve an individual, using an optical or electron microscope, identifying and counting miniscule asbestos fibers, the relative experience and fatigue of the person doing the counting can influence the ultimate accuracy and precision of a given analysis.

Many of the epidemiological studies which established the link between the inhalation of asbestos and cancer used phase contrast microscopy ("PCM") techniques to measure asbestos concentration. However, PCM is considered inadequate for the analysis of a short fiber mineral such as chrysotile. Many of these studies were done before transmission electron microscopy ("TEM") techniques were available. Most studies today use TEM as the "state of the art" analytical technique for measuring airborne asbestos concentrations. In the City of Coalinga, the ambient air samples were measured using TEM while the soil samples were measure using polarized light microscopy ("PLM"). Limited TEM analyses of the soils samples were used for confirmation. To use TEM data in quantitative risk assessments, one must convert TEM data to PCM Equivalent ("PCME") data using a conversion factor. There are a variety of ways to perform this conversion; whenever conversions of this type are done, the ability to describe risks quantitatively with accuracy is diminished. The Agency must make risk management decisions despite the fact that the science of risk assessment and techniques for measuring asbestos concentrations continue to evolve.

EPA has determined that because asbestos is a known human carcinogen with no acceptable known threshold level for environmental exposure, and the potential for release of asbestos from the Site is high, a significant health risk exists. While a quantitative risk assessment is not possible because of the analytical problems associated with the measurement of asbestos, a clean-up goal of less than or equal to 1 area percent by PLM is consistent with CERCLA's requirements and with past Agency decisions regarding asbestos clean-up levels at other Superfund sites. See Appendix 1 for further discussion of this clean-up level. The adverse human health effects from exposure to asbestos are extremely serious. Therefore, remedial action is warranted to mitigate the exposure to a carcinogen that is present as a result of human activity.

8.0 DESCRIPTION OF ALTERNATIVES

EPA evaluated potential remedial action alternatives for the City of Coalinga Operable Unit in accordance with CERCLA Section 121, the National Contingency Plan ("NCP"), (in particular, 40 C.F.R. Section 300.68), and the Interim Guidance on Superfund Selection of Remedy, December 24, 1986 (OSWER Directive No. 9355.0-19).

The first step in evaluating potential remedial action alternatives was to determine, based upon Site characteristics, what set of response actions and associated technologies would be considered for the Site from among all possible alternatives. An example of this preliminary determination (or "scoping") was the elimination of biological treatment from further consideration because biological processes capable of detoxifying asbestos contaminated soil do not exist. Section 2.1 of the OUFS discusses the scoping process in more detail.

The next step in the selection of remedy process was assembling the remaining technologies and/or disposal options into general remedial action alternatives. Pursuant to OSWER Directive No. 9355.0-19, remedial action alternatives are to be developed ranging from those that would eliminate the need for long-term management (including monitoring) at the Site to alternatives involving treatment that would permanently reduce the mobility, toxicity or volume of the hazardous substances(s) as their principal element. In addition, containment options involving little or no treatment and a no action alternative are to be developed. The remedial action alternatives developed in the OUFS were:

- No Action
- Fencing of the Contaminated Areas
- Capping
    - a) Soil
    - b) Asphalt
    - c) Soil-Cement
    - d) Gunite
    - e) Multi-Layer
- On-Site Disposal
- Treatment by Chemical Fixation
    - a) Plant Processing
    - b) Area Mixing
- Thermal Vitrification
- Removal and Off-Site Disposal

The No Action alternative serves as a basis for comparison in analysis of the other remedial action alternatives under consideration. Fencing of the contaminated area is an access restriction alternative involving no treatment. Capping would require long term management. On-site disposal would reduce the need for long term management at the Site. Off-site disposal would eliminate the need for long term management and monitoring at the Site (although monitoring and long term management would be required at the off-site disposal site). Chemical Fixation and Thermal Vitrification involve treatment as their principal element.

After the initial screening, the most promising of these alternatives were analyzed in greater detail in Section 2.1.2 of the OUFS. The five remedial alternatives that were fully analyzed are described in the following paragraphs:

Alternative 1: No action

This action would involve no action to treat, contain, or remove contaminated soil, equipment, or structures. Multimedia monitoring would be performed at a minimum of every five years to aid in a reassessment of the no action alternative.

Alternative 2: Off-Site Disposal at a Mine Site Near Coalinga

This alternative would involve decontamination of the buildings and disposal of all asbestos ore wastes and other mining wastes at an abandoned mine near Coalinga.

Alternative 3: Covering Waste with One Foot of Asbestos-Free Soil

This alternative would involve decontamination of the buildings, off-site disposal in an approved facility of waste mining materials stored in the Marmac Warehouse, and covering all areas of the Site that tested positive for asbestos ore waste with one foot of asbestos-free soil.

Alternative 4: Off-site Disposal of Waste in an Approved Landfill

This alternative would involve decontamination of the buildings, and disposal of all asbestos ore wastes and other mining material at an approved off-site landfill.

Alternative 5: Construction of an On-Site Waste Management Unit

This alternative would involve decontamination of the buildings, and construction of an on-site waste management unit ("WMU"). All asbestos ore wastes and other mining material would be collected and disposed of in the WMU. The material in the WMU would be capped in accordance with the California Administrative Code, Title 23, Chapter 3, subchapter 15. The conceptual design of the WMU is included in the Design Report, found in the Administrative Record (Doc. # 624).

9.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

This section provides an explanation of the criteria used to select the remedy, and an analysis of the five remedial action alternatives in light of those criteria, highlighting the advantages and disadvantages of each of the alternatives.

Criteria

The alternatives were evaluated based on the nine key criteria which directly relate to the factors that CERCLA Section 121(b)((1)(A-G) mandates that the Agency assess in selecting a remedy. These criteria are:

(1) overall protection of human health and the environment,
(2) short term effectiveness in protecting human health and the environment,
(3) long-term effectiveness and permanence in protecting human health and the environment,
(4) compliance with ARARs (ARARs are detailed in Section 10.0),
(5) Use of treatment to achieve a reduction in the

toxicity,mobility or volume of the contaminants
(6) implementability,
(7) state acceptance,
(8) community acceptance, and
(9) cost.

Because there is no feasible treatment technology for asbestos containing mining materials, criterion number five is not directly relevant to a choice among alternatives. However, the alternatives were compared with respect to their ability to minimize the mobility (through the air or ground water pathways) of the asbestos-containing material. Criterion number six, implementability, is also not a factor in choosing among alternatives. Implementability is the technical and administrative feasibility of a remedy as well as the availability of services and materials to carry out the remedy. All five alternatives are equally implementable. For these reasons, neither of these criteria are included in the following comparison of alternatives.

Alternative 1 - No action Alternative

This alternative would not reduce present or future exposure to hazardous substances at the Site, and thus would not be protective of human health and the environment. The risk to human health and the environment would not be addressed. Although this is the least expensive alternative, it would not achieve compliance with ARARs and would not provide a permanent solution.

Alternative 2 - Removal of Wastes to the Mine Sites

The environmental and public health protection provided by this alternative is better than the no action alternative but less than alternatives four or five. Environmental degradation is expected to increase over time. Increased exposure to the contaminants would occur during implementation; engineering controls would be implemented during the collection of contaminated soils that would minimize this potential for exposure. Transportation and off-loading operations at the abandoned mine site would result in additional exposure as compared to on-site disposal. The lengthy amount of time needed to implement this alternative would also result to increased risk because of the period of no action at the Site. Contrary to the OUFS' conclusion that this alternative would satisfy all ARARs, this alternative would not meet the requirements of California Administrative Code, Title 22 with respect to Class B Mining Wastes); it would also not meet the NESHAP requirements at 40 C.F.R. § 61.153. This alternative is expected to meet with community approval based on the community's express desire to have the wastes removed from the City. State perception of this alternative is expected to be negative.

The cost of this alternative is extremely high. Costs would include the extension and/or repair of roads and utilities to the chosen mine site. The cost for this alternative is estimated at $7 to $9 million and is the highest of all alternatives considered. The schedule to implement this alternative is estimated at one to two years due to the need for road construction.

Alternative 3 - Covering Waste with Non-Contaminated Fill

The human health risk during implementation of this alternative would be moderately high. As in alternative 2, engineering controls would be implemented that would minimize the exposure during movement of mining wastes. Long term protectiveness of human health and the environment would be less than that achieved with alternatives 2, 4 or 5 because the asbestos ore waste would remain under the clean soil cover and could be disturbed by human activity or natural processes, such as an earthquake.

This alternative would meet federal ARARs for the disposal of asbestos waste but would not meet State ARARs for disposal of a class B mining waste. The Site would require long term operation and maintenance of a more significant nature than that required by any of the other alternatives. This alternative includes leaving hazardous material on-site. Therefore, review of the remedial action at five year intervals would be required pursuant to CERCLA Section 121(c), 42 U.S.C. § 9621(c). Also, deed restrictions would be placed on a large portion of Coalinga, thus limiting future land use.

Alternative 3 is the least costly of the alternatives which provide active remediation. The estimated cost is between $600,000.00 and $800,000.00. Alternative 3 could be implemented in approximately four months. This alternative would negatively impact the future development in Coalinga and would leave a high public health risk in the town.

Alternative 4 - Removal of Waste to an Off-Site Landfill

This alternative would provide adequate protection of human health and the environment. Short term risk to human health and the environment would be moderate and would occur during the on-site operations, transport of the contaminated material, and placement in the new disposal location. During these operations, engineering controls would be implemented to minimize this risk. This alternative would achieve compliance with all ARARs. This alternative received favorable consideration by the community. State perception of this alternative is expected to be negative because valuable landfill space would be occupied.

The cost of this alternative would be high. The estimated cost is $5.5 million, with the majority of this cost being the cost of disposing of the material in the off-site landfill. This alternative could be implemented in four to six months.

Alternative 5 - Disposal of Material in an On-Site Landfill

This alternative would provide adequate protection of human health and the environment. Exposure would occur during movement of the wastes on-site. The short term risk to public health and the environment from this exposure route is less than that expected with Alternative 4, because contaminated materials will be transported a shorter distance (to the WMU site). Engineering controls would be implemented to minimize any short term risk. This alternative would achieve compliance with all ARARs. Long term operation and maintenance would be required, as would a review at five year intervals pursuant to CERCLA Section 121(c), 42 U.S.C. § 9621(c).

This alternative raised community concerns over the location and visual impact of the WMU. To alleviate these concerns, EPA will require modification of the WMU specifications to reduce the height of the WMU crown to as close to grade level as is technically feasible.

The cost for this alternative is approximately $1.5 to 2.5 million. This alternative could be implemented in approximately four to six months.

Further Discussion of Specific Criteria

The following discussion provides a more-detailed analysis of several of the comparative aspects of the five alternatives.

Overall Protection of Human Health and the Environment

Alternatives 4 and 5 provide the most protection of human health and the environment of all the alternatives. Alternatives 4 and 5 are essentially equal in their overall protection of human health and the environment, except that alternative 4 involves somewhat greater exposure during implementation. While there is no feasible treatment technology for asbestos-containing mining materials, alternatives 4 and 5 reduce mobility of asbestos fibers by eliminating entrainment into the air of asbestos laden soils and dust. Alternatives 2 and 3 are not as protective of human health and the environment in that environmental degradation may increase over time. Alternative 2 would remove the threat to Coalinga in the short term, but would exacerbate the overall regional public health and environmental risks because the mine site would receive uncontained mining waste piles. Alternative 3 would leave areas containing asbestos-contaminated soils more readily subject to disturbance by human activities as well as natural disasters (such as an earthquake). Alternative 1 provides no protection to human health or the environment.

Compliance with ARARS

Alternatives 4 and 5 would achieve compliance with ARARs. Alternatives 2 and 3 would violate the State of California ARARs for disposal of a class B mining waste; Alternative 2 would violate the NESHAP ARAR found at 40 C.F.R. § 61.153.

Long-term Effectiveness and Permanence

Alternatives 4 and 5 have the greatest ability to maintain reliable protection of human health and the environment over time, once clean-up goals have been met. The disposal of the asbestos ore wastes and other mining waste materials in an approved landfill or waste management unit is the best way to ensure that asbestos fibers are not released into the air, ground water or surface water pathways. Alternative 5 will achieve long-term effectiveness and permanence as long as the cap integrity is maintained.

Alternative 2 would not be as effective as alternatives 4 and 5 in the long term because, in moving the material from a populated area to a more remote area, future releases of the material from the remote area are not mitigated. The long term effectiveness of alternative 3 is less than that of alternatives 2, 4 and 5 because human activity or a natural disaster could more easily disturb the material.

Short Term Effectiveness

Alternative 1, No Action, would have the least short term impact because it would not generate additional dust or impact on community life, provided access to the Site was restricted. Alternative 3 will generate less dust than Alternatives 2, 4 and 5 because the consolidation and removal in Alternative 3 would be restricted to the Marmac Warehouse. Alternative 2 and 4 will be less effective in the short term than Alternatives 3 and 5 because the transportation and off-loading operations at the off-site locations could have an adverse impact on the health of site personnel. Alternatives 2, 3 and 4 will disrupt traffic to some extent because they involve trucking the waste material off-site. Alternative 5 will have somewhat less impact on traffic in Coalinga. All of the alternatives, other than No Action, will create some noise during removal and construction which may be bothersome in the short term.

Community Acceptance

The community would like the clean-up to proceed as quickly as possible and would like the contaminants to be removed from the Coalinga city limits. Alternative 4 received the most community acceptance.

With respect to Alternative 5, community members expressed concern over the location of a WMU within the city limits, particularly if the WMU is not at or close to ground level. The Coalinga City Council expressed concern over the technical sufficiency of the WMU design. The City Council also prefers the location of the WMU to be within the right-of-way of a future road. EPA and State officials re-examined the WMU proposal in light of these concerns and decided to alter the design specifications for the WMU to require that the cap be as close to ground level as is technically feasible. This was done in order to minimize potential impacts on local development plans. The re-examination also confirmed that the WMU meets all regulatory specifications. The WMU is located in an area identified as a future right-of-way; however, the boundaries of the WMU would extend beyond the width of the right-of-way as currently designed. EPA is not requiring that the WMU be designed to conform to current right-of-way plans; however, EPA is not putting restrictions on land use in the WMU area that would preclude the area being used as a road or a parking structure.

The community is not in favor of Alternative 3 because it would remove too much land from future development. Community acceptance of Alternative 2 is expected to be favorable based on the community's express desire to have the hazardous substances removed from the City.

The attached Responsiveness Summary attached addresses more specific concerns raised by members of the public during the public comment period.

10.0 APPLICABLE or RELEVANT and APPROPRIATE REQUIREMENTS (ARARs)

Under Section 121(d)(1) of CERCLA, 42 U.S.C. § (d)(1), remedial actions must attain a degree of clean-up which assures protection of human health and the environment. Additionally, remedial actions that leave any hazardous substance, pollutant, or contaminant on-site must meet a level or standard of control that at least attains standards, requirements, limitations, or criteria that are "applicable or relevant and appropriate" under the circumstances of the release. These requirements, known as "ARARs", may be waived in certain instances, as stated in Section 121(d)(4) of CERCLA, 42 U.S.C. § 9621(d)(4).

"Applicable" requirements are those clean-up standards, standards of control and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant or contaminant, remedial action, location, or other circumstance at a CERCLA site. "Relevant and appropriate" requirements are clean-up standards, standards of control and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a

CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. For example, requirements may be relevant and appropriate if they would be "applicable" but for jurisdictional restrictions associated with the requirement. See the National Contingency Plan, 40 C.F.R. Section 300.6, 1986).

The determination of which requirements are "relevant and appropriate" is somewhat flexible. EPA and the State may look to the type of remedial actions contemplated, the hazardous substances present, the waste characteristics, the physical characteristics of the site, and other appropriate factors. It is possible for only part of a requirement to be considered relevant and appropriate. Additionally, only substantive requirements need be followed. If no ARAR covers a particular situation, or if an ARAR is not sufficient to protect human health or the environment, then non-promulgated standards, criteria, guidance, and advisories must be used to provide a protective remedy.

Types of ARARs

There are three types of ARARs. The first type includes "contaminant specific" requirements. These ARARs set limits on concentrations of specific hazardous substance, pollutants, and contaminants in the environment. Examples of this type of ARAR are ambient water quality criteria and drinking water standards. The second type of ARAR includes location-specific requirements that set restrictions on certain types of activities based on site characteristics. These include restriction on activities in wetlands, floodplains, and historic sites. The third type of ARAR includes action-specific requirements. These are technology-based restrictions which are triggered by the type of action under consideration. Examples of action-specific ARARs are Resource Conservation and Recovery Act ("RCRA") regulations for waste treatment, storage, and disposal.

ARAR Identification Process

ARARs must be identified on a site-specific basis from information about specific chemicals at the site, specific features of the site location, and actions that are being considered as remedies.

ARARs identified for the Operable Unit address emission of asbestos fibers from contaminated soils, inhalation of asbestos fibers, and disposal of asbestos contaminated soils. In addition, ARARs for disposal of mining waste containing soluble nickel were also identified.

Contaminant-Specific ARARs For Asbestos:

1. Toxic Substances Control Act (TSCA)

EPA has promulgated several rules under TSCA to regulate asbestos in the environment. The most significant of these were promulgated pursuant to the Asbestos Hazard Emergency Response Act ("AHERA"), which was enacted as Title II of TSCA. Under the AHERA, EPA issued regulations related to the inspection and management of friable asbestos in schools (52 C.F.R. § 42826 (1987)). This regulation utilizes PLM as a measurement technique for detecting asbestos; the use of this measurement technique for asbestos is relevant and appropriate to the cleanup of the Coalinga Site.

2. Clean Air Act, National Emission Standard for Hazardous Air Pollutants (NESHAPs)

Asbestos was first designated as a hazardous air pollutant under the Clean Air Act in 1971. The National Emission Standard for Hazardous Air Pollutants ("NESHAPs") for asbestos found at 40 C.F.R. § 61.152 and 40 C.F.R. § 61.156 are ARARs for the implementation of the remedy at this Site. 40 C.F.R. § 61.153 is an ARAR for the completion of the remedy at the Site.

Location-Specific ARARs:

Because the Site is located in an area that contains endangered species (i.e., the kit fox and the blunt-nosed leopard lizard), the following requirements are ARARs for the Site:

1. The Endangered Species Act of 1973, 16 U.S.C. § 1536(a)(-(d)

Generally, when a project potentially impacts an endangered species or critical habitat, activities carried out by Federal agencies should not jeopardize the continued existence of an endangered species or cause adverse modifications of critical habitat.

2. USFWS Mitigation Policy (FR 7644-7663, Vol 46, No. 15, January 1981).

This policy is triggered in accordance with the Fish and Wildlife Act of 1956, Fish and Wildlife Coordination Act, Watershed Protection and Flood Prevention Act and the National Environmental Policy Act. The mitigation policy defines resource categories and establishes mitigation goals and guidelines for each. Guidelines to achieve the goal include avoiding or minimizing habitat loss, immediate rectification or reduction of habitat loss or replacement of habitat in kind.

Action Specific ARARs:

1. Occupational Safety and Health Administration ("OSHA")

OSHA has set a permissible exposure limit ("PEL") for all asbestos fibers at 0.2 fiber per cc for occupationally exposed workers (51 C.F.R. § 22612 (1986)). While this standard was meant for occupational exposure (8 hours per day, 40 hours per week, 52 weeks per year) and not for continuous ambient exposure, it provides an upper threshold for evaluating permissible ambient exposure limits. In other words, a concentration of .2 PCM fibers per cc of respirable air or less is not permissible for ambient exposure, since this requirement is relevant and appropriate for exposure during the cleanup of this Site.

Contaminant-Specific ARARS for Soluble Heavy Metals:

1. California Administrative Code, Title 22

Title 22, Chapter 30, Section 66740 (a) of the California Administrative Code lists "...wastes which shall be classifiable as special wastes pursuant to Section 66744 provided they meet the criteria and requirements of Section 66742". The California State Water Quality Control Board ("SWQCB") has classified nickel-containing wastes such as those at the Site as Class B mining wastes, as described in Title 23, Chapter 3, subchapter 15, Section 2571(b)(2). Under California regulations (Title 23, Subchapter 15) a Class B mining waste must be disposed of in a capped landfill. This requirement is an ARAR for the Site.

Location Specific ARARs for Soluble Heavy Metals:

1. California Administrative Code

Pursuant to Title 23, Chapter 3, Subchapter 15, Article 7, Section 2570(b), a mining waste pile, including a waste management unit, may be exempted from the liners and leachate collection and removal system requirements of Article 7, Section 2572, if it can be demonstrated that leachate will not form in or escape from the waste management unit ("WMU"). Section 2570(c) allows the RWQCB to exempt a Group B mining waste management unit from these liner and leachate requirements of Article 7 if a comprehensive hydrogeologic investigation demonstrates that:

" (1) there are only very minor amounts of groundwater underlying the area; or

(2) the discharge is in compliance with the applicable water quality control plan; and

(3) either natural conditions or containment structures will prevent lateral hydraulic interconnection with natural geologic materials containing ground water suitable for agricultural, domestic or municipal beneficial uses. There is no detectable vertical hydraulic interconnection between the natural geologic materials underlying the unit and natural geologic materials containing such ground water." Article 7, Section 2570(c).

The WMU for this Site is appropriately exempted from these liner and leachate provisions on the basis that the requirements of Article 7, Section 2570(c)(1), and alternatively, the requirements of (2) and (3), are met. See the memorandum from the California Central Valley Regional Water Quality Control Board ("CVRWQCB"), dated April 7, 1989, Administrative Record Doc. # 1075, attached as Appendix 2 to this ROD, and hereby incorporated by reference. The requirements of this Appendix 2 must be met for full implementation of this ROD.

The Class B mining waste regulations found at Title 23, Chapter 3, Subchapter 15, Section 2571, (b) (2) (A) of the California Administrative Code are satisfied by either (1) removal of the asbestos ore waste and other mining waste to a capped landfill or (2) burial of the asbestos ore waste and other mining waste in an on-site WMU. Cap requirements are outlined in Title 23, Chapter 3, Subchapter 15. If the waste is stored in an on-site WMU, the regulations require that a groundwater monitoring be located at the point(s) of compliance. Title 23, Chapter 3, Subchapter 15, Section 2553.

11.0 THE SELECTED REMEDY

Alternative 5, disposal of the asbestos ore waste and other mining waste in an on-site waste management unit ("WMU"), is the selected remedy for the City of Coalinga Operable Unit. This includes collection and on-site disposal of all asbestos ore waste and other mining waste material as well as decontamination of all buildings, structures and other equipment at the Site. The excavated areas will be regraded with clean material, containing less than or equal to one area percent asbestos by PLM. The WMU will be constructed in accordance with California Administrative Code, Title 23, Chapter 3, Subchapter 15; the WMU is exempt from the liner and leachate collection requirements of Article 7 of this Subchapter.

The wastes are asbestos with some soluble nickel. Asbestos is insoluble and thus poses does not pose a significant threat to the groundwater. Any leachate movement through the unsaturated zone to the ground water will be very slow and is unlikely to carry asbestos in suspension. The waste does not generate acid and therefore leachate containing soluble nickel is not likely to be produced. In addition, the ground water in the Coalinga area is not potable. All of the drinking water used by the City of Coalinga is taken from the California Aqueduct.

All contaminated soils and other similar materials will be cleaned up to less than or equal to one area percent asbestos by PLM and to at or below background for nickel. A positive correlation between the presence of asbestos and nickel has been established at the Site. As the asbestos-contaminated areas are being remediated, the nickel-contaminated areas will also be remediated. The contaminated soils and other materials occupy an area of approximately 11 acres and total approximately 14,500 cubic yards.

A major feature of the selected remedy is the construction of the WMU. The WMU will measure approximately 225 feet square, have a capacity of 25,000 cubic yards and will be designed and constructed to comply with all ARARs. The final cover or cap will consist of the following (from bottom to top):

-- A two foot foundation layer of compacted clean material that contains less than or equal to 1 area percent asbestos by PLM.

-- A one quarter inch impermeable bentonite mat with a permeability of less than 10 E -6 cm/sec.

-- A protective soil cover that contains less than or equal to one area percent asbestos by PLM and is at least one foot in thickness.

-- Either a four inch asphalt concrete paving or a vegetated cover.

The design will include two neutron probe access tubes to detect increases in moisture content due to leachate migration. In addition, ground water monitoring well(s) will be required within one quarter mile of the perimeter of the WMU.

The WMU will be constructed to prevent the ponding of water on the cap. The cap will be situated as close to grade level as is feasible. Strict asbestos/dust control measures will be implemented during the entire construction of the WMU and the collection and consolidation of the asbestos ore waste and other mining material. These activities will comply with the NESHAPs ARARs. In addition, ambient air sampling (with associated meteorological monitoring) and personnel monitoring will be conducted during construction and removal activities to fulfill the following objectives:

1) Ensure that asbestos/dust control measures are effective in containing fugitive contaminant emissions,

2) Ensure that the remedial activity is not affecting the surrounding community through the spread of fugitive asbestos fibers, and

3) Document exposure levels of site personnel work activities to determine compliance with appropriate levels of protection for workers.

A verification sampling plan will be instituted to confirm that the cleanup levels have been achieved for the soil and other materials. The building structures will also be sampled to verify removal of asbestos from contaminated surfaces.

Operation and maintenance activities will be required to ensure the effectiveness of the WMU. These activities include: (1) quarterly visual inspections to ensure the integrity of the cap for three years, with annual visual inspections thereafter, (2) any repair work necessary to maintain the integrity of the cap, including maintenance of the vegetation, (3) groundwater monitoring, and (4) monitoring of soil moisture content using neutron probes. EPA will review the remedial actions effectiveness at five year intervals, pursuant to CERCLA Section 121(c), 42 U.S.C. § 9621(c).

The chromite ore waste ("chromite waste") in the Marmac Warehouse will be disposed of in the WMU unless the chromite waste has been removed from the site by October 16, 1989, pursuant to an EPA approved plan. Any draft plan for removal and disposition of the chromite waste must be submitted to EPA by August 15, 1989 and must include:

1. an adequate health and safety plan that protects on-site personnel;
2. a work plan that provides for the safe removal of the chromite waste material from the Marmac Warehouse and transport to a bona fide recycling/reprocessing facility for recycling and/or reprocessing;
3. adequate documentation from a bona fide recycler/reprocessor that the chromite waste will be handled properly upon receipt at the recycling/reprocessing facility. This documentation must include, but is not limited to: a) copies of all necessary permits, b) details of process to be used to extract the chromium, and c) details of how any asbestos-contaminated residue will be disposed of; and
4. Provisions for compliance with all applicable laws regarding transport of hazardous substances

A final plan must have received EPA approval by September 15, 1989.

The WMU design and associated monitoring activities will be in accordance with the recommendations provided in the CVRWQCB memorandum of April 7, 1989, attached as appendix 2. In addition, a geologist registered by the State of California will observe the excavation of the WMU area to ensure that no geologic faults occur in the area of the WMU.

Using a conservative estimate of $2.5 million, the cost for disposal in the WMU is estimated at $170 per cubic yard, assuming 14,500 cubic yards of contaminated material. Operation and maintenance costs are estimated at $35,000/year. Total present worth cost for the selected alternative is between 1.5 and 2.5 million dollars.

12.0 DOCUMENTATION of SIGNIFICANT CHANGES

The selected alternative for the Site is construction of an on-site WMU and accompanying measures, as detailed in Section 11.0, above. At this time no significant changes from the proposed plan have occurred.

13.0 STATUTORY DETERMINATIONS

Overall Protection of Human Health and the Environment

The selected remedy protects human health and the environment by minimizing exposure to asbestos- and nickel-contaminated materials. The selected remedy also provides for clean-up to the AHERA levels for asbestos abatement and to levels at or below background levels for nickel. Proper operation and maintenance practices will ensure the integrity of the WMU. Strict dust control procedures will be followed during construction. Proper health and safety measures, including ambient air monitoring and personnel monitoring during implementation, will ensure that the health of on-site workers and the local population is protected.

Cost-Effectiveness

The selected remedy is cost-effective in that it provides overall effectiveness commensurate to its costs. The estimated costs of the selected remedy are less than half the costs associated with the removal of the waste to an off-site landfill (Alternative 4), and yet the selected remedy and Alternative 4 are similar in terms of the level of public health and environmental protection provided, except that off-site disposal would involve somewhat greater exposure risk during implementation.

Compliance with ARARs

The selected remedy will comply with all ARARs. Identified ARARs are presented below.

Action-specific ARARs

OSHA requirements for permissible exposure limit (PEL) in 51 C.F.R. 22612 (1986), which specify a PEL for all asbestos fibers at 0.2 fibers per cubic centimeter for occupationally exposed workers.

Contaminant-specific ARARs

PLM measurement technique for asbestos, pursuant to AHERA regulations.

NESHAP requirements found at in 40 C.F.R. § 61.152, 40 C.F.R. § 61.153, and 40 C.F.R. § 61.156.

Title 22, Chapter 30, Section 66740(a) of the California Administrative Code, which classifies the nickel-bearing waste as a special waste.

Title 23, Chapter 3, Subchapter 15, Article 7, Section 2571(b)(2), which classifies the waste as a class B mining waste. Under Subchapter 15, class B mining wastes must be disposed of in a capped landfill. The WMU is exempt (pursuant to Section 2570) from the liner and leachate requirements found in Article 7 of this Subchapter.

Location-specific ARARs

Endangered Species Act of 1973, 16 U.S.C. § 1536 4(a) - (d), regarding endangered species and critical habitat.

USFWS Mitigation Policy establishes guidelines for minimizing habitat loss (FR 7644-7663 Volume 46 number 15 January 1981).

Utilization of Permanent Solutions to the Maximum Extent Practicable

Currently there is no known permanent treatment or resource technology which would control release of asbestos from the soil at the Site. Chemical fixation and thermal vitrification were alternatives identified in the Feasibility Study but they were eliminated from further consideration due to difficulties associated with implementation, uncertain long term effectiveness and very high cost. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined, and the State has concurred, that the selected remedy provides the best balance of the various factors that CERCLA requires be considered in remedy selection.

The selected remedy is preferable to off-site disposal with respect to short term effectiveness and cost. Since the selected remedy and the off-site disposal alternative are reasonably comparable with respect to protection of public health and the environment, long term effectiveness, ARARs compliance, and implementability, the major tradeoffs that provide a basis for this selection decision are short term effectiveness, community acceptance, state acceptance, and cost. The selected remedy has better short term effectiveness, is more acceptable to the state, and can be performed at less cost than the other alternatives; it also can be performed in a relatively short time frame compared to some of the alternatives. It is therefore determined to be the most appropriate solution for the contaminated soils at the City of Coalinga Operable Unit.

Preference for Treatment as a Principal Element

Currently there is no proven treatment technology that would permanently and significantly reduce the mobility, toxicity or volume of asbestos. Since no effective treatment method exists for asbestos, the statutory preference for this type of treatment as a principle element of the remedy cannot be satisfied. Although several treatment technologies were investigated during the feasibility study, it was determined that no technology presently exists that would result in a permanent and significant decrease in the toxicity, mobility or volume of asbestos. Alternative 5 was found to represent the best method for addressing the threats posed by the Site, taking into account all of the statutory requirements and preferences.

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DOCUMENT CATEGORY	DOCUMENT NUMBER	DESCRIPTION SUBJECT	FROM	TO	DOCUMENT DATE
0100.15	566	Review: Asbestos Exposure Indices	Morton Lippman		7/18/87
0100.15	567	Asbestos Exposure Indices	Morton Lippman		2/88
0100.15	573	Long-term Health Effects on Hamsters and Rats	David M. Smith		10/28/86
0100.15	574	Health Effects of Asbestos w/letter	Richard A. Griesemer	Lee M. Thomas	7/30/85
0100.15	575	Update of SAB Activities w/memo	Kathleen Conway	Lee M. Thomas	6/12/85
0100.15	576	Major Issues Associated with Health Effects of Asbestos	Science Advisory Board		no date
0100.15	577	Semi-quantitative Determination of Asbestiform	P.M. Cook		no date
0100.15	578	Inhalation of Fibrous Dusts (Annals NYAS)	V. Timbrell		12/31/65
0100.15	579	Reserve Mining Ends Lake Dumping			no date
0100.15	580	Asbestos in Drinking Water - A Canadian View	P. Toft		no date
0100.15	581	Adverse Health Effects of Arsenic and Asbestos			no date
0100.15	582	Environmental Effects of Off-road Vehicles	Robert H. Webb		no date
0100.15	583	Asbestos: Properties, Applications & Hazards, vol. 2	S.S. Chissick		no date
0100.15	584	In vitro Approaches for Determining Mechanisms of Toxicity	Brooke T. Mossman		no date
0100.15	585	Critical Review of Epidemiologic Studies	Gary M. Marsh		10/13/82

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0100.15	587	Electron Microscopy & X-ray Applications: Chapter 11	Philip A. Russell		no date
0100.15	588	Membrane-filter Direct-transfer Technique for Analysis	Garry J. Burdett		no date
0100.15	589	Asbestos in the Home	US Consumer Product Safety Commission		no date
0100.15	590	Asbestos Fact Book	EPA		5/86
0100.15	591	Asbestos in Schools			no date
0100.15	592	Methodology for the Analysis of Asbestos in Soils	Stephen B. Hayward		no date
0100.15	593	Asbestos in Buildings	EPA		7/85
0100.15	594	Asbestos in Drinking Water	Kevin Browne		no date
0100.15	596	Region 9 Asbestos News	EPA		6/87
0100.15	597	Ltr re: Asbestos Exposure at Federal Building & Courthouse	Kenneth M. Wallingford	L.L. Mitchell	8/6/84
0100.15	599	ASTDR Policy on Health Assessments			5/87
0100.15	601	Superfund Public Health Evaluation Manual	EPA		10/86
0100.15	602	EPA: National Revised Primary Drinking Water Reg.	Federal Register, vol. 48, no. 194		10/5/83
0100.15	627	Strategy for Asbestos Hazard Identification	ICF/Clement Associates	Camp Dresser & McKee	9/18/87
0100.15	628	Technical Support Doc: Public Hearing to Consider the Adoption of a Reg. Amend.	CA Air Resources Board		2/10/86

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0100.15	629	Ambient Water Quality Criteria: Asbestos	EPA		1978
0100.15	630	Interim Method for the Determination of Asbestos in Bulk Insulation Samples	UP EPA		12/82
0100.15	631	Federal Register v. 50, no. 219: Asbestos			11/13/85
0100.15	632	Memo re: MCL for Asbestos in Drinking Water	Frank M. Covington	John Wise	11/15/83
0100.15	633	Groundwater Newsletter v. 12, no. 20 (Oct. 31, 1983) w/letter	Ronald D. Kill	Richard Martyn	12/1/83
0100.15	634	EPA: 40 CFR Pt. 61 National Emmission Standards for Hazardous Air Pollutants.. Final Rule	Federal Register, vol. 49, no. 67		4/5/84
0100.15	635	Reports on Health Effects of Asbestos w/letter	Joseph A. Cotruvo	Terry F. Yosie	4/22/85
0100.15	636	Technical Comments re: Health Effects of Asbestos w/letter	Richard A. Griesener	Lee M. Thomas	7/30/85
0100.15	637	EPA Environmental News & Fact Sheet on Asbestos	EPA		1/16/86
0100.15	638	EPA: 40 CFR Pt. 763: Asbestos, Proposed Mining & Import Restrictions & Proposed Manufacturing Importation & Processing Prohibitions	Federal Register, vol. 51, no. 19		1/29/86
0100.15	639	Asbestos Waste Management Guidance	EPA		no date
0100.15	640	EPA: Water Quality Criteria Documents, Availability	Federal Register, vol. 45, no. 231		11/28/80
0100.15	665	Importance of Wind-blown Dust in Risk Assessment	EPA		1/88

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0100.15	666	Application of TEM to Ambient Monitoring w/letter	Bruce A. Hollett	Melanie Field	2/1/88
0100.15	667	EPA Study of Asbestos-containing Materials	EPA		2/88
0100.15	668	Toxilogical Profile for Nickel. Draft	ATSDR		1/16/88
0100.15	669	Microscopical Innovations for Asbestos Analysis	John Gustav Delly		4/87
0100.15	670	Asbestiform Fibers: Nonoccupational Health Risks	National Research Council		8/1/84
0100.15	671	Asbestos in Buildings: Technical Bulletin	EPA		5/88
0100.15	672	Airborne Levels of Mineral Fibre	William J. Nicholson		no date
0100.15	673	Environmental Asbestos: Problems Associated with PLM Soil Analysis	Jennifer A. Decker		no date
0100.15	708	Minerals and Health: The Asbestos Problem	Malcolm Ross		no date
0100.15	709	Asbestos: Toward a Perspective	H. Wesley Peirce		1983
0100.15	710	Commercial Laboratories with Polarized Light Microscope	Research Triangle Institute		8/87
0100.15	711	Ban of Consumer Patching Compounds	16 CFR Chapter 11		1/1/85
0100.15	712	Chrysotile Asbestos in a California Recreation Area	Science, vol. 206		11/9/79
0100.15	713	EPA: 40 CFR Pt 763: Asbestos-containing Materials in Schools, Final rule and Notice	Federal Register, vol. 52, no. 210		10/30/87

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0100.15	714	OSHA, 29CFR Pt. 1910 and 1926 Occupational Exposure to Asbestos... Final Rules	Federal Register, vol. 51, no. 119		6/20/86
0100.15	715	Asbestos in Water Supplies of the U.S.	James R. Millette		no date
0100.15	716	Asbestos (C&EN)	Pamela S. Zurer/C&EN		3/4/85
0100.15	717	Fact Sheet: Asbestos in Drinking Water			3/1/83
0100.15	734	Ltr re: Occurrences of Special Animals and Plants	Stephen (illegible)/ CA Dept. of Fish and Game	Donna La Bar	11/8/83
0100.15	735	Map: California Natural Diversity Data Base	CA Dept. of Fish and Game		10/83
0100.15	834	Properties of Fine Particles Which Govern Their Biological Activity	Penelope Morton		1/85
0100.15	835	Asbestos	Bunker Hill SCR		no date
0100.15	836	Ltr re: Comments on Asbestos Abatement Techniques	Ralph D. Zumwalde	James Gideon	4/24/85
0100.15	837	Asbestos			7/10/85
0100.15	838	Filter Blank Contamination in Asbestos Abatement	Thomas J. Powers		4/24/86
0100.15	839	Characterization of Three Types of Chrysotile Asbestos	Kent E. Pinkerton		1983
0100.15	840	Correlation of In Vitro And Vivo Methods	David L. Coffin		1983
0100.15	841	Asbestos Analysis Case History	Michael J. McGuire		9/82
0100.15	842	Asbestos Analysis Case History	Michael J. McGuire		12/8/81
0100.15	843	Asbestos Standards	National Bureau of Standards		10/1/80

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0100.15	844	Concentration & Size of Asbestos in Water	James R. Millette		2/80
0100.15	845	Chrysotile Asbestos in a California Recreational Area	W.C. Cooper		11/9/79
0100.15	846	Exposure to Asbestos from Drinking Water in the U.S.	James R. Millette		8/79
0100.15	847	Decontaminating Lake Superior of Asbestos Fibers	Richard P. Schmitt		5/77
0100.15	848	Symposium on Fugitive Emissions	Research Corp. of New England		5//17/76
0100.15	849	Experimental Determination of the Number 1 Size of Asbestos Fibers	Walter John		1/76
0100.15	850	Asbestiform Amphibole Minerals	Philip M. Cook		9/74
0100.15	851	Asbestos in Drinking Water	G.M. Kay		9/74
0100.15	852	Serpentine Flows on Joaquin Ridge	Darrel S. Cowan		9/70
0100.15	853	Mineral & Water Resources of California			1966
0100.15	854	California Asbestos Industry	Salem J. Rice		9/63
0100.15	855	Ambient Air Concentrations of Asbestos Fibers	Bhawan Singh		3/5/84
0100.15	856	Dredging to Reduce Asbestos Concentrations	Jeanine Jones		2/87
0100.15	857	Accuracy of Transmission Electron Microscopy	Eric B. Steel		1/85
0100.15	858	Field Monitoring of Chrysotile Asbestos	Steven B. Hayward		3/84
0100.15	859	Membrane-filter, Direct Transfer Technique for the Analysis of Asbestos	Garry J. Burdett		1983

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0100.15	860	Measurement of Asbestos Fibre concentrations	Eric J. Chatfield		5/83
0100.15	861	Asbestos in California Water. Draft	Stephen B. Hayward		7/83
0100.15	881	Major Issues with Health Effects of Asbestos w/letter	EPA - Science Advisory Board		no date
0100.15	882	Memo: Site Characterization	Chris Chalfany	Ruben Moreno	8/29/88
0100.15	886	Ltr re: City Construction	Robert Willey	L.W. Pepple	5/2/88
0100.15	887	Article: Asbestos	BNA: Environmental Reporter		11/9/84
0100.15	898	Fact Sheet: Asbestos Substitute Materials & Producers	Western Institute for Occupational & Environmental Sciences		1981
0100.15	904	Environmental News Fact Sheet	EPA		10/11/85
0100.15	908	Clipping: Cleanup at New England Asbestos Dump Shows Costs Can Offset Health...	Raymond Joseph		9/13/83
0100.15	909	Article re: Asbestos	Environmental Engineering News		7/84
0100.15	922	Clipping: Asbestos in the Western San Joaquin Valley	Jeanine Jones/ California Geology		7/88
0100.15	923	Clipping: 1987 California Mining Review	California Geology/ John Burnett		10/88
0100.15	924	Environmental News Fact Sheet re: Phase Out Asbestos Use	EPA		1/23/86
0100.15	989	Draft Excerpt re: Asbestos Analytical Methods	Charles E. Robinson	Jennifer Decker	8/11/88
0100.15	998	Percent by Area Diagrams	Randy Boltin	Jennie Decker	8/9/88

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0100.15	1001	Cancer and Asbestos in Drinking Water	West Coast Cancer Foundation		3/27/80
0100.15	1002	Airborne Asbestos Health Assessment Update	EPA		6/86
0100.15	1003	Chronic Hazard Advisory Panel	US Consumer Product Safety Commission		7/83
0100.15	1004	Characterization & Control of Asbestos Emissions	C.F. Harwood		9/74
0100.15	1006	Determinants of Cancer and Cardiovascular Disease Mortality	R.A. Ziskind		no date
0100.15	1007	Study of the Problem of Asbestos in Water	American Water Works Association		9/74
0100.15	1008	Health Aspects of Asbestos in Drinking Water	Robert C. Cooper		6/75
0100.15	1009	Exposure to Asbestos Fibers in Water Distribution Systems	Richard S. Woodhill		5/8/77
0100.15	1010	Some Aspects on the Dosimetry of the Carcinogenic Potency	Freidrich Pott		12/78
0100.15	1011	Asbestos: Warning, Dangerous to Health			12/78
0100.15	1012	Ingested Mineral Fibers	Philip M. Cook		4/79
0100.15	1013	Health Effects & Prevalence of Asbestos Fibers	Leland J. McCabe		6/24/79
0100.15	1014	Asbestos: Expedience, Exposure & Human Experience	Michael R. Gray		no date
0100.15	1015	Preparation of Extrapulmonary Tissues	Philip M. Cook		12/14/79
0100.15	1016	Effects of Long-term Ingestion of Asbestos	Kelley J. Donham		1980

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0100.15	1017	Evidence of Migration of Ingested Asbestos	Kusum J. Patel-Manalik		1980
0100.15	1018	Asbestos in Drinking Water & Cancer Incidence	Marty S. Kanarek		1980
0100.15	1019	Pathological Effects of Prolonged Asbestos Ingestion	R.E. Bolton		1982
0100.15	1020	Cancer Causing Chemicals - Asbestos			1981
0100.15	1021	Assessment of Risks Posed by Exposure	Marvin A. Schneiderman		4/81
0100.15	1022	Cancer Morbidity Investigations	Eunice E. Sigurdson		1981
0100.15	1023	Determination of Mineral Fiber Concentrations in Fish	A.R. Batterman		4/24/81
0100.15	1024	Mineral Fiber Contamination of Western Lake Superior	Philip M. Cook		1/6/81
0100.15	1025	Policy Problems Associated with Waterborne Asbestos	Michael Sheehan		4/81
0100.15	1026	Relation of Particle Dimension to Carcinogenicity	Mearl F. Stanton		11/81
0100.15	1027	Interpretation of the Carcinogenicity of Amosite	Philip M. Cook		2/17/82
0100.15	1028	Pathogenesis of Asbestos-Associated Diseases	John E. Craighead		6/17/82
0100.15	1029	Public Health Aspects of Water Supplies	CA Dept. of Water Resources		12/31/82
0100.15	1030	Short and Thin Mineral Fibers	E.J. Chatfield		no date
0100.15	1031	Asbestos Drinking Water: A Status Report	Joseph A. Cotruno		1983

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0100.15	1032	Drinking Water and Health, vol. 5	National Research Council		1983
0100.15	1033	In Vitro Effects of Mineral Fibers	Lalita D. Palekar		1983
0100.15	1034	Review of Published Studies on Gut Penetration	Philip M. Cook		1983
0100.15	1035	Bibliographies from Online Computer Databases			8/4/83
0100.15	1036	Summary: Workshop on Ingested Asbestos			10/13/83
0100.15	1037	Groundwater Newsletter			10/31/83
0100.15	1038	Groundwater News			2/84
0100.20	608	Reconaissance Report: Soil & Air Sampling Strategy	Al Vargas & Sean Kennedy	Jennifer Decker	5/6/87
0100.20	609	Memo re: Retaining FIT Contractors for Sampling Event w/map and Photos	Jenny Decker	Amy Zimpfer	4/13/87
0100.20	611	Memo re: Soil Sampling Plan w/attached Memo	Stewart Simpson & Greg Czajkowski	Jennifer Decker	6/12/87
0100.20	612	List of Sample Locations			7/7/87
0100.20	652	CERCLA Soil Sampling Plan	Sean Kennedy	EPA	6/5/87
0100.20	654	Soil Sampling Plan Approval	Stewart Simpson and Greg Czajkowski	Jennifer Decker	6/12/87
0100.25	603	4 Aerial Photos, 2 Photos of Building			no date
0100.25	605	Aerial Photo			no date
0100.25	653	Sample Documentation Report	Ecology & Environment	EPA	9/7/87

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0500.01	651	Atlas and Coalinga PRP Mailing List			no date
0500.01	661	Ltr re: Asbestos Cleanup	David W. Long	Scott Rahlfs/City Manager	5/4/88
0500.01	754	Ltr re: Other PRP's. Attached: 9/14/87 Letter	David W. Long	EPA	12/28/87
0500.01	756	Ltr re: Advice Regarding Di-*minimus* Status	Jennifer Decker	Carla J. Irvine	9/20/88
0500.01	761	Ltr re: Request for Further Information	David B. Stanton	Jennifer Decker	11/1/88
0500.01	762	Ltr re: Request for Information - Wheeler Properties	Dorothy G. Bunce/Reno, NV	Jennifer Decker	7/5/88
0500.01	764	Ltr re: Property Ownership	Bob J. Wampton	Jennifer Decker	7/7/88
0500.01	765	Ltr re: Responsibility for Asbestos Removal	John W. Johns	Jennifer Decker	6/30/88
0500.01	766	Ltr re: Asbury Transportation Co. Liability	Dean Prettyman	Jennifer Decker	6/21/88
0500.01	767	Ltr re: California Minerals Corp.	Claude W. Bridges	Jennifer Decker	6/21/88
0500.01	768	Ltr re: Potential Liability	Richard E. Blubaugh	Jennifer Decker	6/24/88
0500.01	769	Ltr re: Kern County Land Co.	David B. Stanton	Jennifer Decker	5/23/88
0500.01	770	Ltr re: Westside Trucking	Henry T. Leckman	Jennifer Decker	6/29/88
0500.01	771	Ltr re: Marmac	Carla J. Irvine	Jennifer Decker	8/9/88
0500.01	772	Ltr re: Willingness to Participate in Response Activities	Richard E. Blubaugh	Jennifer Decker	7/22/88
0500.01	773	Ltr re: Notice Letter	David B. Stanton	Jennifer Decker	7/19/88

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0500.01	774	Ltr re: Notice Letter	Robert K. Behrens	Jennifer Decker	8/9/88
0500.01	775	Ltr re: Transport of Material	John D. Clarke		5/27/88
0500.01	797	Ltr re: Other PRP's	David W. Long	EPA	9/14/87
0500.01	805	Ltr re: Response to 106(a) Regarding Ownership	David W. Long	EPA	8/28/87
0500.01	943	Response to Notice Letter	Claude W. Bridges	Jennifer Decker	6/21/88
0500.01	944	Ltr re: Notice Letter	John W. Johns	Jennifer Decker	6/30/88
0500.01	945	Ltr re: Extension of Response Date	David E. Noyes	Jennifer Decker	5/16/88
0500.01	946	Ltr re: Participation in Response Activities	David E. Noyes	Jennifer Decker	6/23/88
0500.01	947	Ltr re: Correction to Previous Letter	David E. Noyes	Jennifer Decker	7/8/88
0500.01	948	Response to Notice Letter	Bob J. Hampton/ Coalinga, Ca	Jennifer Decker	7/7/88
0500.01	949	Ltr re: Briefing Meeting	Philip L. Fitzwater	Jennifer Decker	8/26/88
0500.01	950	Response to Notice Letter	David E. Noyes	Jennifer Decker	7/7/88
0500.01	951	Ltr re: Briefing	George M. C. Robinson	Jennifer Decker	9/22/88
0500.01	952	Response to Notice Letter	David B. Stanton	Jennifer Decker	6/20/88
0500.01	953	Response to EPA Letter of 6/13/88	Dean Prettyman	Jennifer Decker	6/21/88
0500.01	992	Ltr re: Potential Liability	Richard E. Blubaugh	Jennifer Decker	6/24/88
0500.10	728	Telecommunication re: Compliance w/Section 106 Order	David Long	Bill Wick	8/26/87
0500.10	729	Telecommunication re: Compliance w/Section 106 Order	Lewis Mitani	David Long	8/26/87

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0500.20	619	Ltr re: Answer to 104 Letter w/insurance Policies, Maps, Property Ownership Recs	David W. Long	Jeff Zelikson	4/29/88
0500.20	620	Ltr with Accompanying Maps, Figures re: EPA Request for Information	Richard Blubaugh	Jennifer Decker	6/3/88
0500.20	808	Ltr re: Financial & Insurance Coverage Information w/attachments	Richard E. Blubaugh	Jennifer Decker	5/5/82
0500.20	833	Ltr: Response to 104(e) Letter w/support Documents	Kenneth B. Prindle	EPA	5/6/88
0500.20	862	Ltr re: Request for Information & Real Estate Purchase Contract	Bob J. Hampton	Jennifer Decker	4/19/88
0500.20	863	Response to 104(e) Letter w/exhibit A	Claude W. Bridges	Jennifer Decker	4/19/88
0500.20	865	Response to 104(e) Letter	John W. Johns	Jennifer Decker	4/29/88
0500.20	866	Responses to 104(e) Letter w/annual Report & Transmittal Letter	David E. Noyes	Jennifer Decker	6/22/88
0500.20	867	Response to 104(e) Letter	Lee Quick	Jennifer Decker	4/18/88
0500.20	868	Response to 104(e) Letter	Lowell Baker	Jennifer Decker	4/25/88
0500.20	869	Response to 104(e) Letter	A.J. Eyraud	Jennifer Decker	4/6/88
0500.20	871	Response to 104(e) Letter	David B. Stanton	Jennifer Decker	5/23/88
0500.20	872	Response to 104(e) Letter	David B. Stanton	Jennifer Decker	4/8/88
0500.20	873	Ltr re: Request for Information w/annual Report	T.C. Sager	Jeff Zelikson	5/10/88
0500.20	874	Ltr re: Request for Information	Richard G. Tisch	Jennifer Decker	5/16/88

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0500.20	875	Ltr re: Denial of Connection with Coalinga Asbestos	Joseph P. Cerullo	Jennifer Decker	4/19/88
0500.20	1041	Ltr re: Respopnse to 104(e) Letter	Dorothy G. Bunce/ Reno, NV	Jennifer Decker	7/5/88
0500.25	641	Certified Mail Receipt w/letter and Envelope	Jennifer Decker	Robert Hampton	4/6/88
0500.25	757	Ltr re: Section 104 PRP Responses	Sue Johnson	David Long	8/4/88
0500.25	758	Ltr re: PRP 104(e) Responses	Eve Johnson	Kevin Maroff	8/4/88
0500.25	776	104(e) Letter	Jeff Zelikson	David W. Long	3/18/88
0500.25	777	104(e) Letter	Jeff Zelikson	Floyd Crable	3/18/88
0500.25	778	104(e) Letter	Jeff Zelikson	Wayne Broome	3/18/88
0500.25	779	104(e) Letter	Jeff Zelikson	Ronald Bowmann	3/18/88
0500.25	780	104(e) Letter	Jeff Zelikson	Charles Squire	3/18/88
0500.25	781	104(e) Letter	Jeff Zelikson	Lowell Baker	3/18/88
0500.25	782	104(e) Letter	Jeff Zelikson	Edward Heine	3/18/88
0500.25	783	104(e) Letter	Jeff Zelikson	Claude Bridges	3/18/88
0500.25	784	104(e) Letter	Jeff Zelikson	Richard Johnson	3/18/88
0500.25	785	104(e) Letter	Jeff Zelikson	Al Eyraud	3/18/88
0500.25	786	104(e) Letter	Jeff Zelikson	Steve Kerdoon	5/2/88
0500.25	790	104(e) Letter	Jeff Zelikson	Lee Quick	3/18/88
0500.25	791	104(e) Letter	Jeff Zelikson	Robert Hampton	3/18/88
0500.25	792	104(e) Letter	Jeff Zelikson	John Johns	3/18/88
0500.25	815	104(e) Letter	Jeff Zelikson	Weavers	3/18/88

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0500.25	824	104(e) Letter	Jeff Zelikson	Richard B. Von Wald	3/18/88
0500.25	830	104(e) Letter	Jeff Zelikson	Earl Chambers	3/18/88
0500.25	831	104(e) Letter	Jeff Zelikson	Irving Moore	5/12/88
0500.25	939	Ltr re: Correction to Previous Letter	Jennifer Decker	Robert Hampton	5/24/88
0500.30	759	Signed Order Directing SPTC to Take Action	EPA	D.K. McNear	8/21/87
0500.30	804	Ltr re: SPTC Compliance	David W. Long	EPA	8/27/87
0500.30	806	Comments by SPTC on EPA Order 87-04	David W. Long		9/4/87
0500.30	820	Ltr re: Potential Liability to the Site	Jeff Zelikson	Edward Heine	4/28/88
0500.30	821	Ltr re: Potential Liability to the Site	Jeff Zelikson	Earl Chambers	4/28/88
0500.30	822	Ltr re: Potential Liability to the Site	Jeff Zelikson	Weavers	4/28/88
0500.30	823	Ltr re: Potential Liability to the Site	Jeff Zelikson	Wayne Broome	4/28/88
0500.30	954	Ltr re: Potential Liability	Jeff Zelikson	A. Eyraud	6/13/88
0500.30	955	Ltr re: Potential Liability	Jeff Zelikson	Edward Heine	6/13/88
0500.30	956	Ltr re: Potential Liability	Jeff Zelikson	Charles Squire/ Burbank, CA	6/13/88
0500.30	957	Ltr re: Potential Liability	Jeff Zelikson	Wayne Broome	6/13/88
0500.30	958	Ltr re: Potential Liability	Jeff Zelikson	John Johns	6/13/88
0500.30	959	Ltr re: Potential Liability	Jeff Zelikson	Lowell Baker	6/13/88
0500.30	960	Ltr re: Potential Liability	Jeff Zelikson	Irving Moore	6/13/88

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0500.30	961	Ltr re: Potential Liability	Jeff Zelikson	Richard G. Tisch	6/23/88
0500.30	962	Ltr re: Potential Liability	Jeff Zelikson	David Noyes	6/23/88
0500.30	963	Ltr re: Potential Liability	Jeff Zelikson	Mr. Weaver	6/23/88
0500.30	964	Ltr re: Potential Liability	Jeff Zelikson	Irving Moore	6/23/88
0500.30	965	Ltr re: Potential Liability	Jeff Zelikson	E. Heine	6/23/88
0500.30	966	Ltr re: Potential Liability	Jeff Zelikson	Earl Chambers	6/23/88
0500.30	967	Ltr re: Potential Liability	Jeff Zelikson	Wayne Broome	6/23/88
0500.30	968	Ltr re: Potential Liability	Jeff Zelikson	David Noyes	6/13/88
0500.30	969	Ltr re: Potential Liability	Jeff Zelikson	Lee Quick	6/13/88
0500.30	970	Ltr re: Potential Liability	Jeff Zelikson	Robert Hampton	6/13/88
0500.30	971	Ltr re: Potential Liability	Jeff Zelikson	Claude Bridges	6/13/88
0500.30	972	Ltr re: Potential Liability	Jeff Zelikson	Mr. Weavers	6/13/88
0500.30	973	Ltr re: Potential Liability	Jeff Zelikson	Claude Bridges	6/23/88
0500.30	974	Ltr re: Potential Liability	Jeff Zelikson	Earl Chambers	6/13/88
1401.01	559	Ltr re: Removal Action Conducted By SPTC	Jennifer Decker	L.W. Pepple	9/26/88
1401.01	561	Ltr re: Review of Hazardous Substance Containment Report	Jeff Zelikson	L.W. Pepple	9/27/88
1401.01	570	Cover ltr: RI/FS Documents	Jennifer Decker	Gary Carozza	no date
1401.01	571	Cover ltr: RI/FS Document	Jennifer Decker	Martha Hennly	9/16/87
1401.01	572	Cover ltr: RI/FS Documents	Jennifer Decker	Lonnie Wass	3/1/87
1401.01	613	Ltr re: Project Coordinator Position	Jennifer A. Decker	L.W. Pepple	8/31/87
1401.01	614	Revised Comments on Hazardous Substence Containment Plan w/letter	Jennifer A. Decker	L.W. Pepple	9/15/87

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1401.01	615	Ltr re: Sample Community Relations Fact Sheet	Jennifer Decker	L.W. Pepple	9/15/87
1401.01	616	Transmittal Ltr: Sample Documentation Reports	Jennifer Decker	L.W. Pepple	9/17/87
1401.01	617	Ltr re: Submission of EPA's Final Review of Analytical Data	Jennifer Decker	L.W. Pepple	12/8/87
1401.01	658	Cover letter: Airborne Asbestos Sampling Data Report	Jennifer Decker	L.W. Pepple	7/11/88
1401.01	659	Ltr re: Conduct a Biota Survey & Construct an On-site Vault	Robert D. Willey	Jennifer Decker	2/19/88
1401.01	660	Ltr re: Field Trip to Collect Data	Robert D. Willey	Jennifer Decker	5/10/88
1401.01	664	Landfill Design with Fax Cover Page	Leonard O. Yamamoto	ATEC Environmental Consultants	8/16/88
1401.01	690	Cover Letter for RI/FS Documents	Jennifer Decker	Jeanine Jones	9/16/87
1401.01	737	Ltr re: Airborne Asbestos Sampling Data Report	Jeanine Jones	Jennifer A. Decker	1/27/88
1401.01	738	Memo: Risk Assessment Procedures w/letter	Jeanine Jones	Jennifer A. Decker	10/26/87
1401.01	795	Ltr re: Addendum to IT/SPTC Hazardous Substance Containment Plan	Robert D. Willey	EPA	12/8/87
1401.01	796	Meeting Notes: Comments on Field Investigation Report	L.W. Pepple	EPA	9/8/87
1401.01	799	Ltr re: Events on Site w/distribution List	G.L. Murdock	EPA	9/24/87
1401.01	800	Ltr re: Hazardous Substance Containment Plan Addendum II	Robert D. Willey	EPA	1/15/87

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1401.01	802	FAX Cover ltr: Senate Bill 2572	Bob Willey	Jenny Decker	9/11/87
1401.01	807	Cover ltr: Hazardous Substances Containment Plan	David W. Long	EPA	9/4/87
1401.01	897	Chain of Title of SP Right-of-way w/letter	Gary Fairbanks	Jenny Decker	3/4/88
1401.01	982	Ltr re: Planning of Winter Air Sampling Plan	Scott R. Huntsman	Jennifer Decker	2/23/87
1401.01	986	Transmittal Ltr: Expanded Air SAP	Michael C. Richards	Nancy Lindsay	8/17/87
1401.01	1039	Inspection Report w/Transmittal Letter	Ruben Moreno	Dave Howell	7/29/88
1401.01	1040	Inspection Report w/transmittal Letter	Ruben Moreno	Thomas Sager	7/29/88
1401.05	703	Emergency Response Action Summary with 2 Photos	Brad Shipley	Jennifer Decker	6/6/88
1401.05	747	Memo: SPTC & Machine Shop Area	Jennifer Decker	Greg Baker	4/25/88
1401.15	618	Hazardous Substance Containment Plan w/letter. Draft	Dennis Robinson	EPA	9/18/87
1401.15	794	Ltr: Comments on Hazardous Substance Containment Plan	Dennis M. Robinson	EPA	9/28/87
1401.15	1005	Draft: Hazardous Substance Removal Plan	ATEC Environmental Consultants		12/88
1401.20	704	Memo re: Re-analysis of Coalinga soil sample	Sean Kennedy	Kent Kitchingman	11/3/87
1401.20	809	Standard Operating Procedures of Asbestos Soil Samples w/attachments	Dennis Robinson	Jennifer Decker	9/11/87
1401.20	976	Quality Assurance Project Plan	Roland A. Sanford		5/8/86

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1401.20	977	Air Monitoring Sampling Plan. Draft	J. David Dean		8/19/85
1401.20	978	Draft Air Sampling & Analysis Plan	Woodward-Clyde		1/15/86
1401.20	979	Ltr re: Equipment for Air Sampling	J. David Dean	Dan Hutton	10/1/85
1401.20	980	Adddendum to Draft Air SAP	Woodward-Clyde		11/20/85
1401.20	981	Draft Equipment List			no date
1401.20	984	Ltr re: Additional Airborne Asbestos Data	David Suder	Jennifer Decker	5/27/87
1401.20	985	Memo: Approval of SAP	Al Vargas	Kent M. Kitchingman	9/21/87
1401.20	987	Expanded Air Sampling & Analysis Project Plan	Woodward-Clyde		8/17/87
1401.20	988	Memo: Addendum to Air Sampling Plan	Al Vargas	Jennifer Decker	7/22/87
1401.20	990	Memo: Revision of Air Monitoring Program	David Suder	Donald Harvey	7/29/86
1401.20	991	Memo: Amended Air SAP w/letter	Scott R. Huntsman	Jennifer Decker	7/15/87
1401.20	996	Outline of Expanded Air Sampling Program w/letter	Scott Huntsman	Jennifer Decker	5/12/87
1401.20	997	Amendments to Air SAP	Scott Huntsman	Jennifer Decker	3/5/87
1401.25	595	Interim Health & Safety Guidelines for EPA Asbestos Inspectors	EPA		5/87
1401.25	705	Site Safety Plan	Geoff Watkin	Jennifer Decker	11/25/87
1401.30	674	Ltr re: Permission for EPA to take Soil Samples	EPA		12/14/88
1401.30	760	Ltr re: Permission to Take Soil Samples	Jennifer Decker	Keith Scrivener/ Coalinga	12/14/88

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1401.30	935	Ltr re: Request to Sample Soil	Jennifer Decker	Keith Scrivner	12/14/88
1401.30	936	Ltr re: Request to Sample Data	Jennifer Decker	Robert Hampton	12/14/88
1401.35	691	Attachments to Oversight of Responsible Party Activities	Jacobs Engineering	EPA	12/87
1401.35	706	Oversight of Responsible Party Activities	Jacobs Engineering	EPA	12/87
1401.35	707	Cover letter: Oversight of Responsible Parties	Sue Johnson	Jennifer Decker	12/21/87
1401.40	999	Meteorological Data Report	Woodward-Clyde Consultants		1/15/88
1401.40	1000	Airborne Asbestos Sampling Data Report	Woodward-Clyde Consultants		6/3/88
1401.45	675	Quality Assurance Report w/letter			9/15/88
1401.50	622	Site Characterization	Mark Unruh		8/88
1401.50	623	Hazardous Substance Containment Report	IT Corporation		1/8/88
1401.50	624	Design Report: Asbestos Waste Management Unit w/transmittal Letter	G. Dale Barnhill	Ruben Moreno	1/89
1401.50	625	Hazardous Substance Containment Report, vol. I	ATEC Environmental Consultants		8/88
1401.50	626	Hazardous Substance Containment Report, vol. II of II	ATEC Env. Consultants		8/88
1401.50	798	Draft Hazardous Substance Containment Plan	SPTC		9/18/87
1401.50	801	Revised Hazardous Substance Containment Plan	SPTC		9/28/87

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1401.50	1042	FS Report: OUFS/Hazardous Substance Remedial Plan	ATEC Environmental Consultants		02/89
1401.52	600	Ltr re: Comments on SPTC Hazardous Substance Containment Plan	Jennifer Decker	L.W. Pepple	2/22/88
1401.55	686	Memo: Public Health Assessment from ATSDR and Community Meeting	Jennifer Decker	Don Hawkins	4/22/87
1401.55	687	Memo: Thank You for the Presentation	Jeff Zelikson	Jeffrey A. Lybarger	5/22/87
1401.55	688	Memo: Update on Comm. Relations and Request for Epidemiological Study	Amy Zimpfer	Jeffrey A Lybarger	9/11/87
1401.55	736	Ltr re: Public Health Issues	James T. Allen	Keith Takata	7/2/87
1401.55	876	Review: Draft Evaluation of Potential Relative Risks Associated with Airborne...	Office of Health Assessment	Don Hawkins	4/30/87
1401.55	877	Review: Draft Evaluation of Potential Relative Risks Associated with Airborne...	Office of Health Assessment	ATSDR	5/4/87
1401.55	878	Ltr re: Epidemiological Study	Gail Louis	Don Hawkins	11/5/87
1401.55	879	Memo: Epidemiological Study Request	Lybarger	ATSDR Region 9	12/11/87
1401.55	880	Preliminary Health Assessment w/letter	ATSDR/Von Allmen	EPA/Clifford	11/3/88
1401.55	885	Health Consultation Memorandum w/attachments	Office of Health Assessment	Don Hawkins	4/22/87
1401.57	621	Endangered Species Survey w/cover Letter	IT Corp		4/88
1401.57	656	Ltr re: Biota Survey	Greg Baker	Gail Kabetich	2/5/88

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1401.57	883	Ltr re: Endangered Species. W/attachments	George Nokes	Robert King	6/8/87
1401.57	884	Ltr re: Endangered Species	Dept. of Fish & Wildlife	EPA	2/29/88
1401.60	568	Ltr: Design and Construction of a Waste Disposal Unit	Robert D. Willey	J. Zelikson	4/12/88
1401.60	569	Ltr: Request Guidance to Design a Disposal Unit	R. Nichols Hazelwood	Lonnie Wass	4/11/88
1401.60	689	Ltr: Detailed Identification of CA ARAR	Phil Bobel	James Allen	4/18/88
1401.60	692	SF Transportation Company	Ruben Moreno	R. Nicholas Hazelwood	5/24/88
1401.60	693	Letter	Jeanine Jones	Jennifer Decker	5/4/88
1401.60	732	Memo re: ARAR's	James T. Allen	Phil Bobel	5/11/88
1401.60	733	Memo re: ARARS	Ruben Moreno	Mark Unruh	8/29/88
1401.60	739	Report: Identification of asbestos with letter	James T. Allan	Keith Takata	8/21/87
7000.01	678	Mailing List w/letter	Tory, Peterson & Sugaser	CA Dept.of Water Resources	6/25/85
7000.01	679	Ltr re: Neighborhood Health Problem	Rose Hess	Gail Louis	7/22/xx
7000.01	680	Ltr re: Citizen Concerns w/EPA Response	Motte	Jennifer Decker	4/5/88
7000.01	681	FOIA Request	Robert Hernando	Gail Louis	8/24/87
7000.01	682	FOIA Request	Norma Chew	Ida Tolliver	2/7/88
7000.01	683	Ltr re: Citizen Concerns About the Site	Vincent Motte	Jennifer Decker	1/8/88
7000.01	896	Ltr re: Lack of Cleanup at the Site	D. Scott Rohlfs	David Long	4/13/88

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7000.01	925	Ltr re: Asbestos & Health	Steve Drew	Henry Leckman/Coalinga	3/21/84
7000.01	926	Transmittal Ltr: RI/FS Work Plan	Scott Huntsman	Myron Levin	9/16/86
7000.01	927	Mailing List and Thank You Notes	Steve Drew	Distribution	3/1/84
7000.01	928	Ltr re: Correspondence w/Santa Fe Pacific Realty Corp.	Michele Dermer	Myron Levin	9/15/86
7000.01	929	Ltr re: Meeting to Develop CRP	Gail Louis	Scrivner	no date
7000.01	930	Ltr re: Transmittal of Reports	Gail Louis	Bob King/Coalinga	11/30/88
7000.01	931	Ltr re: Information Repos. Update	Gail Louis	Kay Anthony	11/30/88
7000.01	932	Ltr re: Information Repos. Update	Gail Louis	Kay Anthony	4/14/88
7000.01	933	Transmittal Ltr: CRP	Gail Louis	"People"	3/18/88
7000.01	934	Ltr re: City Council Meeting	Gail Louis	Vincent Motte	1/20/88
7000.15	676	Revised Draft CRP	WCC		3/88
7000.20	888	Clipping: EPA and Other Studies Asbestos	UPI		1/29/85
7000.20	889	Clipping: County Plans Asbestos Tests	Hollister Free-Lance		11/14/83
7000.20	890	Clipping: Costa Will Visit Arenal	Fresno Bee		5/10/83
7000.20	892	Clipping: Asbestos Plant Opens	Mineral Information Service		12/64
7000.20	893	Clipping: Residents Receive EPA Letter	Coalinga Record		7/22/87
7000.20	894	Clipping: EPA Studying Coalinga Asbestos Situation	Coalinga Record		11/18/87

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7000.20	895	Clipping: Ground Rupture, Coalinga Earthquake of 1983	M.C. Junkin/Hart		8/83
7000.20	899	Clipping: Huron Chief Responds to Hiring Controversy Story	Coalinga Courier		11/17/87
7000.20	900	Clipping: Asbeston Fibers Found in Drinking Water Supplies			no date
7000.20	901	Clipping: Local Meet to Explore Asbestos Fiber Cleanup	Steve Anthony/ Hollister Free-lance		no date
7000.20	902	Clipping: Public Is Excluded from Environmental Agency Meeting Here			no date
7000.20	903	Clipping: Proposal for Clear Creek Area Outlined	Fresno Bee		10/30/85
7000.20	905	Clipping: Asbestos Found in Streams	Russell Clemings/ Fresno Bee		9/7/85
7000.20	907	Clipping: Asbestos in Aqueduct Worries State	Robert Jones/LA Times		2/9/84
7000.20	910	Environmental News Fact Sheet			4/85
7000.20	911	Fact Sheet: Coalinga Asbestos			7/16/85
7000.20	912	Superfund Update: RI/FS	EPA		6/87
7000.20	914	Meeting Packet w/agenda	EPA		1/7/88
7000.20	915	Asbestos Fact Sheet			no date
7000.20	916	Meeting Overhead Slides			no date
7000.20	917	Press Release: City of Coalinga Proposed Plan	EPA	Ann Zawila/KFO Radio	1/30/89
7000.20	918	Superfund Update: Expected Schedule for Removal	EPA		4/88

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7000.20	919	Clipping: Asbestos From Sludge Used in Fertilizers May Be Collecting on Farmland	Amal Kumar Naj/Wall Street Journal		11/9/88
7000.20	920	Clipping: Family Stick With Asbestos-ridden Home	San Jose Mercury News		11/1/88
7000.20	921	Clipping: Asbestos Can Cause Cancer by Transporting DNA	San Jose Mercury News		11/1/88
7000.50	657	Ltr re: Request for Relocation Funds	Susan Robinson	Jennifer Decker	no date
7000.50	662	Ltr re: Relocate Mobile Home	G.L. Murdock	Ruby Goolsby	10/11/88
7000.50	663	Estimate to Remove Mobile Home	L.R. White	Ruby Goolsby	8/15/88
7000.50	684	Ltr re: Ownership Certificate for Ruth Goolsby's Trailer	Gail Lewis	David W. Long	4/12/88
7000.50	685	Ltr re: Moving Ruth Goolsby's Trailer	Gail Lewis	David W. Long	9/23/88
7000.50	741	ROC re: Ruby Goolsby's trailer	US EPA	Carolyn McFarland	3/15/88
7000.50	743	ROC Re: Ruth Goolsby's Trailer	Gail Louis	Susan Robinson	4/6/88
7500.00	677	Ltr: Explain the Delay of Site Cleanup w/attachments	Daniel McGovern	Tony Coelho	9/13/88
8000.25	755	Ltr re: Confidentiality Claim	Jeff Zelikson	Carla J. Irvine	9/28/88

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DATE	AR #	AUTHOR	RECIPIENT	DESCRIPTION/SUBJECT
01/01/84	AR1	Roger Scholl James Stratta Editors		Coalinga California Earthquake of May 2, 1983 - Reconnaissance Rpt (Document Date 1/84)
08/21/87	AR2	Jenny Decker Environmental Protection Agency, Region IX, S.F.		Memo: Communication Strategy - 106 Order SPTC 87-04
02/22/88	AR3	Sue Johnson Jacobs Enginering Group Inc.		Comments on IT Corp's Hazardous Substance Containment Rpt w/TL to Jenny Decker 3/15/88
05/06/88	AR4	Earl Chambers Marmac Resources Company	Jenny Decker Environmental Protection Agency, Region IX, S.F.	Ltr: Response to 104(e) Ltr - General Overview of Operations, Confirming Extension to Submit Further Information
06/16/88	AR5	Jenny Decker Environmental Protection Agency, Region IX, S.F.	Lee Quick Interstate Towing	ROC: Notice Ltr, Addresses Mixed Up
01/30/89	AR6	Mark Unruh International Technology Corporation	Scott Rohlfs Coalinga City Manager	Ltr: Comments on Design Rpt For Asbestos Waste Management Unit
02/01/89	AR7	Mark Group		Proposed Specifications For Marmac Warehouse Chromite Ore Body Removal and Transportation (Document Date 2/89)
02/01/89	AR8	Environmental Protection Agency, Region IX, S.F.		Fact Sheet - Asbestos Cleanup in Coalinga (Document Date 2/89)
02/10/89	AR9	Sue Johnson Jacobs Enginering Group Inc.	Jenny Decker Environmental Protection Agency, Region IX, S.F.	Ltr: Comments on Asbestos Waste Management Unit w/Attachments

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02/13/89	AR10	Carla Feldman Shield & Smith, Representing Marmac Resources Company	Dan Meer Environmental Protection Agency, Region IX, S.F.	ROC: Special Notice Ltr, Chromite Ore in Warehouse
02/17/89	AR11	Greg Baker Environmental Protection Agency, Region IX, S.F.	Dan McGovern Environmental Protection Agency, Region IX, S.F.	Memo: Briefing on City of Coalinga OU Superfund ROD
02/22/89	AR12	Environmental Protection Agency, Region IX, S.F.		Transcription of Community Meeting - Asbestos Cleanup Proposed Plan w/Agenda
02/24/89	AR13	Barry Lee Dinkelspiel, Donovan & Reder, Representing Atlas Minerals, Division of Atlas Corporation	Jenny Decker Environmental Protection Agency, Region IX, S.F.	Ltr: Atlas Request for Extensions
02/24/89	AR14	Jenny Decker Environmental Protection Agency, Region IX, S.F.	Carla Feldman Jerry Andes Shield & Smith, Representing Marmac Resources Company	ROC: Marmac Warehouse Clean-up
03/01/89	AR15	Blair King Assistant City Manager of Coalinga	Jenny Decker Environmental Protection Agency, Region IX, S.F.	Ltr: Confirming Extension of Public Review and Comment Period
03/01/89	AR16	Paul Dezurick Graham & James	Jenny Decker Environmental Protection Agency, Region IX, S.F.	Ltr: Concern with the Number of PRPs Participating
03/07/89	AR17	Dan Meer Environmental Protection Agency, Region IX, S.F.	Richard Tisch Union Carbide	ROC: Follow-Up to Notice Ltr

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03/08/89	AR18	Sue Johnson Jacobs Enginering Group Inc.	Jenny Decker Environmental Protection Agency, Region IX, S.F.	Ltr: Comments on Proposed Specifications For Marmac Warehouse Chromite Removal
03/09/89	AR19	Dan Meer Environmental Protection Agency, Region IX, S.F.	Ruben Moreno California Regional Water Quality Control Board - Central Valley Region	ROC: OUFS - Water Board Will Consider Easing Slope Restriction on Landfill
03/13/89	AR20	Sue Johnson Jacobs Enginering Group Inc.	Jenny Decker Environmental Protection Agency, Region IX, S.F.	Ltr: Comments on Proposed Specifications for Marmac Warehouse Chromite Removal
03/15/89	AR21	Jenny Decker Environmental Protection Agency, Region IX, S.F.		Meeting Agenda, List of Attendees, and Notes Re City Council Concerns with WMU/OUFS
03/16/89	AR22	John Loomis Shield & Smith, Representing Marmac Resources Company	Jenny Decker Jon Wactor Environmental Protection Agency, Region IX, S.F.	Ltr: Comments of Marmac to OUFS/HSRP
03/17/89	AR23	Jenny Decker et al Environmental Protection Agency, Region IX, S.F.	Ruben Moreno Michael Mangold California Regional Water Quality Control Board - Central Valley Region	ROC: Conference Call - WMU Design Specs
03/17/89	AR24	John Zikoponlos Western Technologies	Jenny Decker Environmental Protection Agency, Region IX, S.F.	ROC: Comments on OUFS
03/21/89	AR25	Greg Baker Environmental Protection Agency, Region IX, S.F.	Scott Rohlfs Coalinga City Manager	ROC: Latest on Asbestos Cleanup - City Council Position on Proposed Plan

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03/23/89	AR26	Keith Scrivner Mayor of Coalinga	Jenny Decker Environmental Protection Agency, Region IX, S.F.	Ltr: Official Response to EPA Cleanup Plan
03/23/89	AR27	Jenny Decker Environmental Protection Agency, Region IX, S.F.	Bob Willey ATEC Environmental Consultants	ROC: Putting WMU Under a Road
03/23/89	AR28	Conard Harper Simpson Thacher & Bartlett, Representing Atlas Minerals, Division of Atlas Corporation	Jon Wactor Environmental Protection Agency, Region IX, S.F.	Ltr: Comments & Questions on Proposed Asbestos Containment Plan in the City of Coalinga
03/24/89	AR29	Robert Thompson Graham & James	Environmental Protection Agency, Region IX, S.F.	Ltr: Comments on OUFS on Behalf of Vinnell Mining
03/24/89	AR30	Phillip Fitzwater Harding Lawson Associates, Representing Vinnell Mining & Minerals Corporation	Environmental Protection Agency, Region IX, S.F.	Ltr: Technical Review Comments on OUFS Hazardous Substance Remedial Plan on Behalf of Vinnell Mining
04/01/89	AR31	Environmental Protection Agency, Region IX, S.F.		Preparation of a US EPA Region 9 Sample Plan for EPA-Lead Superfund Projects (Document date 4/89)
04/07/89	AR32	Michael Mangold California Regional Water Quality Control Board - Central Valley Region	Ruben Moreno California Regional Water Quality Control Board - Central Valley Region	Memo: Review of Design Rpt Asbestos Waste Management Unit w/TL to L W Pepple 4/7/89
04/13/89	AR33	Ed Cargile California Department of Health Sevices	Dan Meer Environmental Protection Agency, Region IX, S.F.	ROC: Proposed Plan Technically Sound, Must Re-evaluate if Location Moved

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04/19/89	AR34	Dan Meer Environmental Protection Agency, Region IX, S.F.	Bob Willey ATEC Environmental Consultants	ROC: City Will Not Agree to Liner
05/03/89	AR35	Dan Meer Environmental Protection Agency, Region IX, S.F.	Alan Jacobson Coalinga Public Works Department	ROC: Asbestos Rocks Found at Sisk Fountain
05/03/89	AR36	Dan Meer Environmental Protection Agency, Region IX, S.F.	Ed Cargile California Department of Health Sevices	Ltr: Transmittal of Proposed Plan & Request for Comments
05/10/89	AR37	Jerry Clifford Environmental Protection Agency, Region IX, S.F.	Scott Rohlfs Coalinga City Manager	Ltr: General Notice w/Certified Mail Receipt, Domestic Return Receipt and Concurrences
05/19/89	AR38	Dan Meer Environmental Protection Agency, Region IX, S.F.	Scott Rohlfs Coalinga City Manager	ROC: Coalinga's Reaction to General Notice Ltr
05/22/89	AR39	Carla Feldman Shield & Smith, Representing Marmac Resources Company	Dan Meer Environmental Protection Agency, Region IX, S.F.	Ltr: Inquiry into Status of Plan Submitted on Behalf of Marmac for Removal of Chromite
05/25/89	AR40	Laurie Williams Environmental Protection Agency, Region IX, S.F.	John Loomis Shield & Smith, Representing Marmac Resources Company	Ltr: Comments on Marmac's Proposed Cleanup Plan w/Appendix A - Detailed Comments
06/05/89	AR41	Dan Meer Environmental Protection Agency, Region IX, S.F.	Michael Mangold California Regional Water Quality Control Board - Central Valley Region	ROC: STLC and TTLC For Nickel at Coalinga OU
06/08/89	AR42	Dan Meer Environmental Protection Agency, Region IX, S.F.	Ed Cargile California Department of Health Sevices	ROC: DHS Concurrence with Proposed Plan

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06/09/89	AR43	Dan Meer Environmental Protection Agency, Region IX, S.F.	Leonard Yamamoto International Technology Corporation	ROC: Earthquake Stability of the WMU in Coalinga
06/12/89	AR44	Dan Meer Environmental Protection Agency, Region IX, S.F.	Leonard Yamamoto International Technology Corporation	ROC: Details of WMU Design, Left Message For Yamamoto
06/13/89	AR45	Dan Meer Environmental Protection Agency, Region IX, S.F.	Bill Marshall California Regional Water Quality Control Board	ROC: Grade Requirements on Landfill Caps
06/14/89	AR46	Bob Willey ATEC Environmental Consultants	Dan Meer Environmental Protection Agency, Region IX, S.F.	ROC: Spraying in Coalinga, Changes to OUFS
06/14/89	AR47	Dan Meer Environmental Protection Agency, Region IX, S.F.	Ed Cargile California Department of Health Sevices	ROC: Clean-Up Level For Nickel
06/27/89	AR48	Anthony Landis California Department of Health Sevices	Dan Meer Environmental Protection Agency, Region IX, S.F.	Ltr: Concurrence on Proposed Plan
06/30/89	AR49	Environmental Protection Agency, Washington D.C.		Draft Fact Sheet: Final Rule Banning Manufacture, Processing, Importation & Distribution in Commerce of Most Asbestos Products w/Attachment
07/06/89	AR50	H Josef Herbert Associated Press - Article from San Francisco Examiner		News Clipping: US Bans Almost All Asbestos
07/07/89	AR51	Philip Shabecoff New York Times		News Clipping: EPA to Ban Virtually All Asbestos Products by '96

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07/07/89	AR52	San Francisco Chronicle		News Clipping: Most Uses of Asbestos to Be Banned by EPA
07/07/89	AR53	Dan Meer Environmental Protection Agency, Region IX, S.F.	Nicholas Walsh US Department of Transportation	ROC: DOT Requirements for Shipping Hazardous Materials
07/17/89	AR54	Dan Meer Environmental Protection Agency, Region IX, S.F.	Charles Reith Jacobs Enginering Group Inc.	ROC: Cap Design for Coalinga WMU
/ /	AR55	Greg Baker Environmental Protection Agency, Region IX, S.F.	Jenny Decker Nancy Woo Environmental Protection Agency, Region IX, S.F.	Memo: Analytical Methods Being Used and Program Consistency
/ /	AR56	Environmental Protection Agency, Region IX, S.F.		Notice of Public Comment Period & Public Meeting on Proposed Cleanup Plan
/ /	AR57	Jenny Decker Environmental Protection Agency, Region IX, S.F.	Russ Clemings Fresno Bee	ROC: City of Coalinga Cleanup - OUFS/Proposed Plan
/ /	AR58	Environmental Protection Agency		List of Guidance Documents (Documents Available at EPA Region 9 Superfund Records Center)
/ /	AR59			Toxicity Profile for Asbestos
/ /	AR60			Bibliography for the Review of Site Risk
/ /	AR61	Dan Meer Environmental Protection Agency, Region IX, S.F.		Review of Site Risk

Atlas and Johns-Manville Coalinga Superfund Site
City of Coalinga Operable Unit
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DATE	AR #	AUTHOR	RECIPIENT	DESCRIPTION/SUBJECT
/ /	AR62			Draft RI/FS Rpt South Bay Asbestos Area (Document Available at EPA Region 9 Superfund Records Center)
/ /	AR63			Baseline Risk Assessment for the Atlas Mine Superfund Site

CITY OF COALINGA OPERABLE UNIT RESPONSIVENESS SUMMARY FOR THE OPERABLE UNIT FEASIBILITY STUDY AND PROPOSED PLAN

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY RESPONSE TO COMMENTS ON THE PROPOSED PLAN FOR THE CITY OF COALINGA OPERABLE UNIT OF THE ATLAS MINE AND JOHNS-MANVILLE COALINGA ASBESTOS MILL SUPERFUND SITES

I. INTRODUCTION

The United States Environmental Protection Agency (EPA) held a public comment period from February 9 through March 24, 1989 on EPA's Operable Unit Feasibility Study (OUFS) and Proposed Plan for the asbestos and nickel contamination at the City of Coalinga Operable Unit in Coalinga, California. The purpose of the public comment period was to provide interested parties with the opportunity to comment on the OUFS and Proposed Plan. During the public comment period, a public meeting was held in Coalinga on February 22, 1989 to discuss the results and alternatives presented in the OUFS. Public concerns and comments on Site activities and EPA's preferred clean up plan were formally recorded for the public record. The OUFS was made available on February 9, 1989; the complete Administrative Record was delivered to the Coalinga Public Library on February 23, 1989. The original public comment period was scheduled to close on March 2, 1989. This abbreviated public comment period was designed to expedite the clean up process. However, at the public meeting, members of the community as well as representatives for the Potentially Responsible Parties (PRPs) requested more time to review the OUFS and the Administrative Record. EPA then extended the public comment period to March 24, 1989.

On February 9, 1989, copies of the OUFS were delivered to the Coalinga Public Library, the designated information repository for the Atlas Mine and Johns-Manville Coalinga Asbestos Mill Superfund Sites. By February 9, 1989, fact sheets containing EPA's Proposed Plan had been mailed to all interested parties. Notification of the upcoming public meeting was published in Coalinga and Fresno area newspapers.

Section 113(k)(2)(B)(iv) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) requires that EPA respond to each of the significant comments on EPA's Proposed Plan. This responsiveness summary provides a review and summary of community concerns about the Site and significant public comments on the OUFS and the Proposed Plan. In addition to summarizing significant citizen concerns and questions, the Responsiveness Summary presents EPA's responses to those concerns.

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II. OVERVIEW OF THE RECORD OF DECISION AND CRITICAL COMMUNITY CONCERNS

The Agency's selected remedy is the consolidation and burial of asbestos and nickel contaminated material in an on-site Waste Management Unit (WMU). Other alternatives fully analyzed in the OUFS included: i) no action; ii) covering the contaminated waste in-place with one foot of clean soil; iii) removal of contaminated material to an abandoned mine site in the surrounding mountains; and iv) removal of the contaminated material to an approved, off-site landfill.

The community favored removal of the contaminated material from the City and opposed covering the contaminated waste in-place with one foot of clean soil.

This WMU will have an impermeable cap as required by Title 23, Subchapter 15 of the California Administrative Code. The original design included a four percent grade on the WMU. The four percent grade for drainage meant that the crown of the WMU would be six to eight feet above ground level. This was greeted with universal disapproval by the community. The WMU was described at the public meeting as a "visual blight" or an "asphalt dome" which would lower property values in the area, discourage development and negatively impact Coalinga's economy. With these community concerns in mind, EPA asked the California Regional Water Quality Control Board (RWQCB) if it would be possible to reduce the grade of the cap in this case and lower the cap to as close to ground level as is feasible. The RWQCB agreed that the crown for this particular WMU could be lowered. The RWQCB decision was communicated to the Coalinga City Council by EPA representatives at a City Council meeting on April 6, 1989. Mr. Ruben Moreno of the RWQCB was present at this meeting. Another design change made at Coalinga's request was to allow for the possibility of a vegetated surface.

III. SUMMARY OF PUBLIC COMMENTS RECEIVED AND AGENCY RESPONSES

This section includes EPA's response to significant public comments on the OUFS and the Proposed Plan received during the public comment period. The public comments included letters sent to the EPA and comments/questions presented during the February 22, 1989 public meeting. A complete transcript of the public meeting has been entered into the Administrative Record.

EPA has categorized the comments and responses to those comments as follows:

A. Comments made by members of the Coalinga City Council.

B. Comments made by the interested public.

C. Comments made by potentially responsible parties (PRPs).

The comments responded to herein have been summarized or paraphrased as appropriate.

A. COMMENTS BY MEMBERS OF THE COALINGA CITY COUNCIL

A.1 Letter from the Mayor of Coalinga, Mr. Keith Scrivner, dated March 23, 1989. Mr. Scrivner's letter reiterates many comments made by members of the Coalinga City Council at the public meeting, as follows:

A.1.1. Comment: Even though the municipality is the entity on which EPA's decision regarding the Site will have the greatest impact, the City of Coalinga has very little influence on that decision.

A.1.1. Response: Community acceptance is one of nine criteria by which EPA evaluates a remedy. The modification of the proposed plan to accommodate the community's concern regarding the height of the WMU crown and insertion of a flexible requirement for either a vegetative or asphalt cap are examples of the EPA using that criterion in remedy selection.

A.1.2. Comment: The City has not been kept informed of the project status or been involved with design and engineering decisions regarding the WMU. In the last six months, communication between the EPA and the Coalinga community has been inadequate.

A.1.2. Response: In an effort to choose a remedy consistent with community desires and concerns, EPA has communicated and held meetings with representatives of the City of Coalinga frequently throughout the project, specifically since July, 1985. The EPA remedial project manager and community relations coordinator communicated with representatives of Coalinga by letter and fact sheet, and made trips to Coalinga to coordinate the community relations plan with the community and to update the community on the project status. The trips to Coalinga included meetings with City representatives Mr. Bob King and Mr. Bob Semple (both former city planners of Coalinga). These activities occurred between July of 1985 and April of 1989. In April of 1988 the Director of Region IX's Hazardous Waste Management Division, Mr. Jeff Zelikson, attended a City Council meeting to discuss the status of the clean up plan for the City of Coalinga Operable Unit. In November, 1988, representatives of the City of Coalinga, Mr. King (the City Planner) and Scott Rohlfs (the City Manager) met with a representative of ATEC (the consulting firm hired by Southern Pacific Transportation Company (SPTC) to oversee preparation of the WMU design plans) to discuss the design and location of an on-site waste management unit (WMU).

During 1988 several members of the Coaling community and the Coalinga City Council requested that the clean up be completed as quickly as possible. EPA representatives attempted to expedite completion of the proposed plan so that clean up could begin. As noted above, community concerns and needs have been a factor in modification of the design of the WMU.

A.1.3. Comment: Members of the Coalinga City Council believed that the WMU would be located under a road right-of-way. They believe that such a location would be the best possible one, if the WMU must be located within the City limits.

A.1.3. Response: EPA found that there was no technical or environmental basis for requiring the WMU to be located under a road right-of-way. EPA determined that the additional cost for such a WMU was excessive. The ultimate, compatible use for the land above the WMU remains to be determined.

A.1.4. Comment: With hundreds of square miles of open land in the area, why does the waste have to be buried within the City limits?

A.1.4. Response: EPA guidance implicitly recognizes that only a limited number of alternatives for the remediation of each site can be studied in depth. EPA guidance requires identification of one or more alternatives that involve containment with little or no treatment. Guidance For Conducting Remedial Investigations and Feasibility Studies Under CERCLA (October 1988), p. 2-9. Because no feasible treatment exists for asbestos, EPA studied a total of five alternatives in depth, four of which involved containment and not treatment. Two of these alternatives involved taking the waste off-site: (1) disposing of the waste at a permitted landfill and (2) placing the waste in an abandoned mine approximately 20 miles from the Site. At the time that the alternatives to be studied in depth were selected, it was EPA's understanding that the community agreed that an on-site WMU was an acceptable alternative. In response to community input, EPA decided to study an on-site WMU location as close to the edge of the City as feasible. In light of the fact that two off-site containment alternatives were already being studied, EPA did not elect to study any additional off-site alternatives. The bases for rejection of the two off-site alternatives studied are described in the ROD.

A.1.5. Comment: Mayor Scrivner and members of the City Council believe that the WMU design should include a liner, to ensure the maximum protection for the community.

A.1.5. Response: EPA and the California Regional Water Quality Control Board (RWQCB) have determined that a liner is not needed to assure that the WMU effectively protects public health and the environment. See RWQCB Memorandum, dated April 7, 1989, attached as Appendix 2 to the ROD. The cap and drainage system for the unit along with the natural conditions at the Site will provide adequate protection against migration of contaminants. Asbestos is not soluble in water and does not migrate once it has been capped. While the nickel in the material to be buried is soluable, EPA and the RWQCB determined that the presence of this nickel did not justify requiring a liner for the WMU for the following reasons. Coalinga has only approximately seven inches of rainfall per year. There is no detectable vertical hydraulic interconnection between the natural geologic materials underlying the proposed unit and the upper aquifer. A detailed hydrogeologic study of the Site area was performed in August, 1988 by the IT Corporation. This study found that the local groundwater is very deep in this area (greater than 100 feet) and that several impermeable clay layers are present between the surface and the water table in the Site vicinity. In addition, the local ground water in its natural state is not potable. It exceeds the EPA Drinking Water Regulations and the California Department of Health Services (DHS) Drinking Water Standards for sulfate concentrations. The ground water also exceeds the EPA Drinking Water Regulations and the California DHS Recommended Drinking Water Standards for chloride concentrations. As a result this groundwater could not be used for drinking water without substantial treatment.

As an additional safeguard, the Proposed Plan includes monitoring for moisture using neutron probes. Any failure of the cap and/or drainage system will be indicated by moisture detected by the probes and will alert EPA to the necessity of repairing the cap and/or altering the drainage system.

The plan as proposed meets all applicable or relevant and appropriate federal and State requirements (ARARs). Federal regulations require asbestos waste to be capped but do not require asbestos to be placed in a lined vault or a lined landfill

(40 C.F.R. Sections 61.153 and 61.156). Asbestos ore waste that is contaminated with nickel has been classified as a class B mining waste by the State of California. Title 23, Chapter 3, Subchapter 15, Section 2570 (b) of the California Administrative Code states that "[a] regional board may exempt a mining waste pile from the liners and leachate collection and removal systems required in this article if the discharger can clearly demonstrate to the regional board that the leachate will not form in or escape from the waste management unit." Section 2570 (c) provides that regional boards may exempt a mining waste management unit from certain requirements if a comprehensive hydrogeologic investigation demonstrates that "i) there are only very minor amounts of ground water in the area; or ii) the discharge is in compliance with the applicable water quality control plan; and iii) either natural conditions or containment structures will prevent lateral hydraulic interconnection with ... municipal beneficial uses." As explained in the Record of Decision (ROD) and the RWQCB's Memorandum of April 7, 1989, the WMU to be built on the Site has been exempted from these liner and leachate requirements, pursuant to Cal. Admin. Code Tile 23, Chapter 3, Section 2570.

A.1.6. Comment: An elevated crown on the WMU will have a negative economic impact on Coalinga because it will be a "visual blight" which will discourage development in the Site area.

A.1.6. Response: The Record of Decision has modified the Proposed Plan to require that the WMU cap be as close to grade as is feasible. This should minimize any negative visual impact.

A.1.7. Comment: The City of Coalinga questioned whether the City is a Potentially Responsible Party (PRP). As of March 23, 1989, the City had not received any formal notification that it was a PRP.

A.1.7. Response: EPA has notified the City of Coalinga of its status as a PRP pursuant to Section 107(a) of CERCLA in a general notice letter dated May 10, 1989.

A.1.8. Comment The City of Coalinga would like any decision which assigns future liability to ensure that Coalinga does not inherit liability by default if there are no PRPs in existence at some time in the future.

A.1.8. Response: EPA will deal with the issue of liability in the enforcement process. If the City of Coalinga is determined to be a responsible party, it will be jointly and severally liable for all costs associated with the clean up.

A.1.9. Comment: The City is concerned that if land owned by Coalinga is used by SPTC to stockpile waste material during construction of the WMU, the City may have liability if SPTC suddenly quits work in the middle of the project.

A.1.9. Response: The land owned by the City of Coalinga in the proposed stockpile area contains raw asbestos waste piles that contain up to 98 area percent asbestos by PLM. As was noted in the response to comment A.1.8 above, if the City of Coalinga is determined to be a responsible party, it will be jointly and severally liable for all costs associated with the clean up. Therefore, Coalinga's liability will not change if this area is used to stockpile contaminated soil. The ROD does not specify where contaminated material is to be stockpiled. That decision will be part of the remedial design.

A.1.10. Comment: The Mayor and City Council members stated that EPA has attempted to pressure the City into accepting the Proposed Plan by suggesting that making changes in the plan might delay the start of construction. The City representatives indicated that this would penalize the City for making legitimate requests.

A.1.10. Response: EPA has indicated to the City that making changes to the Proposed Plan could cause delays in the start of construction. It was not the Agency's intent, however, to penalize the City in any way, but merely to alert City representatives to the procedures and delays involved in altering the Plan. The WMU design in the Record of Decision has been modified to some extent in accordance with requests by the City. For example, the modifications requested by Coalinga relating to the above ground height of the WMU required a specific waiver by the RWQCB. The process of obtaining this waiver necessarily led to some delay in initiating clean up.

A.1.11. Comment: In response to EPA's comment during the public meeting that the clean up might be delayed by summer heat, the Mayor noted that work could be performed at night and that summer heat should not be an excuse to delay the start of the clean up.

A.1.11. Response: Delays in the issuance of the Record of Decision have made it likely that the work on the remedy will begin in the fall and that summer heat will not be a factor in delaying the clean up. It should be noted, however, that working with respirator protection in very hot weather can be dangerous for on-site workers. In addition, the limited visibility available when using a respirator may make it dangerous to operate heavy equipment at night. If the clean up were to be performed during the summer months, the need for an expedited clean up to protect public health would have to be balanced against the need to protect the health and safety of on-site workers.

A.1.12. Comment: The Mayor suggested that because the OUFS was prepared by a contractor employed by the Southern Pacific Transportation Company (SPTC), that not all of the feasible alternatives were fully explored. The Mayor was concerned that the contractor tried to mitigate the economic impact on SPTC, thereby "casting a considerable cloud on the process."

A.1.12. Response: As required by law, the OUFS was conducted under EPA oversight in accordance with EPA regulations and guidance. Careful oversight by EPA ensured proper preparation of the OUFS. EPA has determined that the alternatives were adequately evaluated in the OUFS.

A.1.13. Comment: The Mayor requested a fifteen (15) day advance notice of any final decisions regarding the Site.

A.1.13. Response: EPA does not provide formal notice of the Record of Decision for public comment. However, EPA has continued and will continue to communicate with City representatives on a regular basis concerning the Site and any decisions concerning the Site remedy.

A.2 COMMENTS BY CITY COUNCIL MEMBERS AT THE PUBLIC MEETING ON FEBRUARY 22, 1989

A.2.1. Comment: City representatives stated that the City of Coalinga will need some technical advice from an environmental attorney or an environmental consultant and that they do not believe that the City should have to pay for that cost.

A.2.1. Response: If Coalinga decides to hire an attorney or a consultant, the City will have to bear that cost. There is no mechanism for EPA to pay that cost. Although EPA does offer technical assistance grants (TAG) of up to $50,000.00 to community groups in areas near Superfund sites, the TAG is not available to municipalities (40 C.F.R. Section 35.4030(a)(4))or potentially responsible parties (40 C.F.R. Section 34.4030(a)(1)), such as the City.

A.2.2. Comment: The public agencies seem to be more concerned with protecting endangered species, protecting non-potable ground water and protecting the health of on-site workers than they are with protecting the health of the people of Coalinga. It doesn't seem right that clean-up should be delayed so that more studies can be done about endangered species when people are breathing asbestos-laden air.

A.2.2. Response: Under its emergency removal authority provided by CERCLA Section 106(a), EPA was able to require spraying of salient on the asbestos piles and restrictions on access, thereby substantially reducing the immediate hazards at the Site.

CERCLA Section 106 authorizes EPA to require such actions quickly to respond to situations posing an imminent and substantial endangerment. Long term remedial response actions, however, must meet applicable federal and State requirements, such as the Endangered Species Act and the Occupational Health and Safety Act, in accordance with CERCLA Section 121(d). Compliance with these applicable or relevant and appropriate laws can require time consuming studies and planning.

A.2.3. Comment: Is a 21 day public comment period legal?

A.2.3. Response: CERCLA Section 117 requires a reasonable opportunity for public comment on the proposed plan. EPA initially decided to use a 21 day public comment period in order to expedite the cleanup process. In response to public concern that this time period was inadequate, the comment period was extended for an additional 22 days, for a total public comment period of 43 days.

A.2.4. Comment: What, if any, land use restrictions will be imposed on properties adjacent to the WMU?

A.2.4. Response: EPA will require all land use restrictions necessary to protect the integrity of the cap and drainage system of the WMU, in order to protect public health and the environment. Land use restrictions will apply to the area of the cap.

A.2.5. Comment: The public comment period did not allow adequate time to examine documents. The OUFS was not available in the repository for review when public comment period opened.

A.2.5. Response: As mentioned previously, the public comment period was extended from March 2, 1989 to March 24, 1989 to allow additional time to examine the OUFS, the Proposed Plan and the Administrative Record. Several copies of the OUFS were mailed by Federal Express to the Coalinga Public Library on February 8, 1989. To the best of EPA's knowledge, the OUFS was available in the Coalinga Public Library on February 9, 1989 as scheduled. As noted above, however, the full Administrative Record was not available at the Coalinga Public Library until February 23, 1989.

A.2.6. Comment: If the City Council categorically rejects the option of locating the WMU within the City limits, what are the other options? The City of Coalinga should not be responsible for the clean up.

A.2.6. Response: Community acceptance is one of nine criteria on which EPA evaluates alternative remedies under CERCLA. As discussed above in Response A.1.4 the OUFS for the City of Coalinga Operable Unit contained detailed evaluations of five alternative remedies. Four of these alternatives did not involve disposal in an on-site WMU. As was noted in Response A.1.4, the

ROD describes the bases for EPA's determination that an on-site WMU is the best remedy under the circumstances. If it is determined that the City of Coalinga is a responsible party, the City will be jointly and severally liable for the costs associated with the selected remedy.

A.2.7. Comment: What is the earthquake rating of the vault? What did the geotechnical studies show about the location of Holocene faults in relation to the proposed vault location?

A.2.7. Response: The WMU is designed to be stable in the event of the maximum credible earthquake expected in the Coalinga area. The earthquake experienced in the Coalinga area in May of 1983 had a maximum peak ground acceleration of .54 g. The WMU is designed to be stable at a ground acceleration greater than or equal to .7 g. The Holocene faults which were active during the 1983 earthquake were not expressed at the surface in the City of Coalinga. No holocene faults have been documented at or near the WMU Site. A geologist registered by the State of California will be present at the Site during excavation of the WMU area to confirm that no faults exist in this area.

A.2.8. Comment: EPA standards for asbestos may change in the future. If less than or equal to 1 area percent asbestos by PLM is no longer considered clean in the future, what will happen to the Site?

A.2.8. Response: If new studies of the effects of asbestos revealed that the health based performance level relied upon in the ROD was not protective of public health or the environment, EPA would reevaluate the situation and take appropriate action.

A.2.9. Comment: Is the WMU classified as a Class 1 hazardous waste landfill? Who owns the land where the WMU is going to be located? Are SPTC and SPLC the same company?

A.2.9. Response: The WMU is not classified as a Class 1 hazardous waste landfill and the waste at the Site is not a Class 1 waste. SPTC owns the property where the WMU will be located. SPTC and SPLC were previously part of the same company; they are currently separate corporate entities.

A.2.10. Comment: The closing of Polk Street and the transport of contaminated material to the WMU area must be done using strict asbestos handling protocol.

A.2.10. Response: EPA will oversee every phase of WMU construction and transport of contaminated material. State and federal regulations regarding transport of asbestos contaminated material will be complied with when material is transported to the stockpile area. This includes wetting down the material, covering the trucks, and ensuring that no spillage occurs. The

route that the trucks take while transporting the contaminated material is a detail of the plan that will be resolved during the design phase.

A.2.11. Comment: City Council members want to ensure that drainage off of the WMU is carefully controlled to avoid flooding problems.

A.2.11. Response: EPA will insure that the design of the WMU includes adequate drainage.

A.2.12. Comment: Can asbestos be compacted to a consistency so that a parking structure can be built on the vault?

A.2.12. Response: Because much of the asbestos is mixed in with soil, there should be no problem with compacting the material to reduce its volume by 95%. This should allow a parking structure to be built on the vault if the City would like to do so.

A.2.13. Comment: Contaminated material is going to be excavated from certain areas in the Site and then replaced with fill material. Will this fill material be clean or will it be 1% contaminated? What are the requirements for compaction of the fill material?

A.2.13. Response: The fill material will have less than or equal to 1 area percent asbestos, which is the detection limit by the EPA-approved testing method (i.e., PLM); this is the selected clean up level for the Site. Compaction requirements have not been ascertained; those requirements will be a part of the detailed design plan.

B. COMMENTS BY THE INTERESTED PUBLIC AT THE PUBLIC MEETING

B.1. Comment: If removal and transport costs are low, why is the cost of shipping the material to the Kettleman landfill so much more than the construction of a WMU?

B.1. Response: The major increased cost associated with the Kettleman option is the charge (per ton of material) to put material into the landfill. The current cost to dispose of asbestos at Kettleman is $200/ton. There are estimated to be approximately 20,000 tons of contaminated material on the Site. Hence it would cost approximately $4 million to deposit the contaminated material at Kettleman. Transportation costs would also be higher to take the contaminated material to Kettleman than to place it in an on-site WMU.

B.2. Comment: Compare the amount of asbestos waste present to the amount of nickel waste present.

B.2. Response: Asbestos and nickel are measured by different methods using different units on different scales. Asbestos is measured using a variety of different units depending on the medium being sampled (i.e. air, soil, water, insulation material, etc.). Nickel is measured in milligrams (mg) per liter or mg. per kilogram. In addition, while sampling performed at the Site has found a range of levels of each contaminant, there has been no measurement of the total volume of either contaminant at the Site. As a result, a direct comparison of the amount of asbestos and nickel waste present is not possible.

B.3. Comment: Who pays for the EPA time on this Site and the cost of operation and maintenance?

B.3. Response: As noted above, EPA will deal with the issue of liability in the enforcement process. Those PRPs who are determined to be liable for the clean up will be responsible for all costs associated with remediation of the Site, including EPA's costs and operation and maintenance costs.

B.4. Comment: The New Idria Serpentine Mass, one of the largest asbestos deposits in the world, is located near Coalinga in the mountains. Asbestos from this formation washes down throughout the whole area, so isn't there greater than one percent asbestos all over the place in Coalinga?

B.4. Response: Naturally occurring asbestos is present in the Coalinga area. EPA is not able to address any hazard which may be posed by this naturally occurring material and is limited to cleaning up asbestos which is present at the Site as a result of human activities. EPA has determined that the large volume of asbestos that is present at the Site was deposited there as a result of the milling, mining and transport of asbestos. The Operable Unit Site was a major shipping depot for asbestos. Asbestos ore and other mining materials were brought in from the mines to Coalinga and then shipped out by train and truck. EPA has determined that the high concentrations of asbestos at the Site are the result of improper disposal and handling of asbestos containing material during these activities. These facts bring the substances at the Site within the purview of CERCLA and a clean up of the asbestos at the Site to health based levels is therefore appropriate.

B.5. Comment: Is the chromite ore in the Marmac warehouse addressed in the clean up plan? Is the chromite ore considered a mining waste? The chromite ore should be considered a resource and not a waste.

B.5. Response: The Proposed Plan provides that the chromite ore in the Marmac warehouse will be disposed of in the WMU unless a plan for its recycling or reprocessing is approved by September

15, 1989 and the material is removed for recycling or reprocessing by October 16, 1989. Analysis of the chromite ore indicate that the chromium content is too low for it to be considered a hazardous waste by the State of California. However, because the chromite ore is contaminated with asbestos at levels exceeding one area percent by PLM, it is a hazardous substance under CERCLA.

B.6. Comment: One community member suggested that the waste be put in the pit at the Granite Rock Company quarry.

B.6. Response: The Granite Rock Company has no connection with the asbestos waste in the City of Coalinga. It is unlikely that a company with no liability for the Site would allow contaminated material to be placed on its land. Further, it would violate State and federal laws to dispose of the material in such a fashion. For example, this action would violate Cal. Admin. Code Title. 23, Chapter 3, Subchapter 15, which requires Class B mining wastes to be disposed of in a WMU with an impermeable cap.

C. COMMENTS MADE BY PRPs IN LETTERS TO EPA AND IN COMMENTS DURING THE PUBLIC MEETING

C.1. Comment: The public comment period did not allow the PRPs adequate time to examine documents, develop a response and/or make a good faith offer.

C.1. Response: Eighteen PRPs were notified of their potential liability in letters from EPA sent in the spring of 1988; the City of Coalinga was notified of its status as a PRP in a letter dated May 10, 1989. PRPs were also provided with notice of the public comment period on the OUFS and Proposed Plan which began on February 9, 1989, and of the extension of that comment period until March 24, 1989.

Eighteen PRPs were notified in a letter dated February 22, 1989 that they would have until March 28 to make a good faith offer to perform the remedial action. While this period is substantially shorter than the sixty days provided for under the special notice procedures of CERCLA Section 122(a), the use of those procedures is discretionary. In this case, EPA chose not to employ those procedures because of the immediate nature of the hazard at the Site. While preliminary steps have been taken to address the hazard, EPA determined that the clean up of this Site should be expedited in light of the significant remaining risk to the public health and the environment.

C.2. Comment: What are the EPA costs to date on the City of Coalinga Operable Unit project?

C.2. Response: EPA costs as of February 2, 1989, were in excess of $89,000.00. This amount does not include costs incurred by SPTC to conduct the feasibility study and draft the Proposed Plan.

C.3. Comment: Marmac Resources, Inc. questioned the professional credibility of IT Corporation (the contractor for SPTC which performed the feasibility study), inferring that because IT stands to benefit from high enough readings to require cleanup, and since its measurements are open to some 'subjective adjustments', self interest may have been a factor in its reports.

C.3. Response: All sampling and analyses have been conducted under strict EPA oversight using Agency procedures, including quality control/quality assurance and chain of custody procedures.

C.4. Comment: The OUFS does not specifically address the potential risk to public health and the environment from short fiber chrysotile asbestos and nickel contaminated soil. No risk assessment was performed and therefore the OUFS cannot be considered complete. Without a complete OUFS, adequate evaluation of alternatives cannot be done.

C.4. Response: The ROD and other documents in the Administrative Record analyze the risk at the Site and the ability of the different remedial alternatives to address this risk. EPA's guidance explicitly recognizes that the level of effort appropriate to performing a risk assessment at a given site depends on many factors, including the concentration and identity of substances, the number of exposure pathways, the likelihood that the "no action" alternative will be chosen (if it is likely that the no action alternative will be chosen, a more thorough risk assessment is necessary). Draft RI/FS Guidance, March 1988, at 3-36 to 3-37. Chrysotile asbestos contamination of soils and the presence of asbestos ore waste and nickel-contaminated waste at the Site have been confirmed by extensive sampling. Asbestos is one of the few known human carcinogens. One pathway is of most concern: inhalation. The uncontained asbestos-contaminated materials are located very close to a population center; without remediation the receptor population, which includes young children, may be subjected to daily exposure. The OUFS and the supporting Administrative Record clearly establish that an imminent and substantial risk to the public health is present at the City of Coalinga Operable Unit. Given all of these factors, it was extremely unlikely that the no action alternative would be chosen. Considering all relevant factors, the analysis of Site risk contained in the Administrative Record meets both the terms and the spirit of EPA's requirements.

Based on extensive experience at numerous other asbestos-contaminated Sites, EPA determined that accurately quantifying baseline risks and the reduction in risk at asbestos-contaminated Sites due to various alternatives is beyond the present capabilities of environmental science. A risk assessment has been conducted for the Atlas and Johns-Manville Superfund Sites to fulfill NCP requirements, which is in part applicable to this operable unit and will be added to the Administrative Record. However, EPA deemed it inadvisable to unnecessarily delay the release of the OUFS and Proposed Plan while awaiting the release of this risk assessment, as it is peripheral to our understanding of the situation in the City of Coalinga and the best way to address it.

C.5. Comment: The evidence linking ingestion of asbestos with adverse human health effects is weak.

C.5. Response: EPA is most concerned about the risk to human health from inhalation of asbestos at this Site; these risks have been widely documented. EPA has also concluded that there is evidence that ingestion of asbestos may also pose a significant risk to human health. Results of studies investigating the link between ingestion of asbestos and cancer have been less conclusive. However, in a National Toxicology Program (1984) bioassay, male rats ingesting intermediate range chrysotile fibers had a significant increase in benign, epithelial neoplasms in the large intestine. EPA considers evidence that a substance causes benign tumors as an indication that the substance is a possible carcinogen.

C.6. Comment: Marmac Resources commented that cleanup of the warehouse area will not solve the airborne asbestos problem in Coalinga.

C.6. Response: EPA has determined that although there is naturally occurring asbestos in the Coalinga area, that the asbestos in the warehouse area of the Site was deposited there as a result of human activity. Therefore a clean up of this hazard is appropriate, as explained in Response B.4. above.

C.7. Comment: Marmac Resources commented that the asbestos in the warehouse area was brought there by natural environmental forces or by other PRPs.

C.7. Response: See Response B.4. above regarding human transport of the asbestos found at the Site. The issue of transport of asbestos to the Site by other PRPs as opposed to Marmac Resources will be dealt with in the enforcement process and is irrelevant to EPA's selection of the remedy for the Site.

C.8. Comment: Marmac Resources commented that the chromite ore in the warehouse area of the Site presents no hazard, or imminent and substantial endangerment to human beings.

C.8. Response: Testing of the chromite ore revealed that chromium content was sufficiently low that the presence of that metal did not pose a hazard. However, sampling also demonstrated that the chromite ore was contaminated with asbestos. It is the asbestos content which is the basis for EPA's determination that the chromite ore must be handled as a hazardous substance.

C.9. Comment: Marmac Resources commented that the chromite ore waste in the warehouse is a strategic mineral which could properly be classified as an exempt non-hazardous mining waste and should be excluded from the Proposed Plan.

C.9. Response: Three companies were contacted by ATEC (consultants to SPTC) regarding disposal of the chromite ore, during the Hazardous Substances Containment Study. Analyses of samples from the chromite ore pile indicated that metal concentrations were too low to be of any commercial use. None of the companies contacted could use the chromite ore. However, the ROD does allow for the possibility of recycling or reprocessing of this material. See also Response C.8., above.

C.11. Comment: Vinnell Mining and Minerals Corporation (VMMC) stated that the sealing of asbestos contaminated material to temporarily suppress dust on the Site should be considered as a remedial action alternative.

C.11. Response: The spraying of biodegradable sealant on the asbestos-contaminated material was an interim action designed to reduce airborne asbestos during the detailed Site investigation. It was not considered as a possible remedial action alternative for the following reasons. Selection of this remedy would violate ARARs and, therefore, would not comply with CERCLA Section 121. The National Contingency Plan also contains a strong bias towards long-term solutions. Spraying with a sealant which has to be reapplied on an annual basis does not meet this criteria. Second, spraying with sealant to contain the asbestos would also require significant land use restrictions on large areas throughout the Site. The community has indicated that it does not favor a remedy that would result in such land use restrictions.

C.12. Comment: VMMC commented that without air monitoring in Coalinga after the spraying of the sealant, it is not possible to judge whether the spraying has had the desired effect of reducing airborne asbestos in the Coalinga railway corridor. If the sealant spraying has not reduced airborne asbestos, then it follows that the source of asbestos in Coalinga must be other nearby or regional sources.

C.12. Response: As mentioned previously, sealant spraying was a temporary action to stabilize the asbestos contaminated areas while evaluating feasible remedial alternatives. Sealant spraying was never intended to be the final remedial action; therefore there was no need to conduct post-spraying air monitoring. Even if such air monitoring had been conducted, it would not yield conclusive data due to the many environmental variables involved. The ROD includes extensive confirmation soil sampling to ensure that the clean up meets the specified goals.

C.13. Comment: Representatives for VMMC believe that the Asbestos Hazard Emergency Response Act (AHERA) has been misapplied. The OUFS applies the one percent AHERA criterion to all samples as opposed to bulk samples.

C.13. Response: In the ROD, EPA determined that less than or equal to 1 percent by PLM is an appropriate, health-based cleanup level for this Site regardless of the AHERA standard. EPA relies on the AHERA ARAR only for the use of PLM as an appropriate method of measuring asbestos area percent. The OUFS was incorrect in this regard. The PLM method, as contained in AHERA, is the only EPA-approved method for measuring asbestos levels in bulk samples, i.e. bulk samples of friable insulation materials, as distinguished from air or water samples.

C.14. Comment: VMMC commented that details of the regional air modeling should be included in the OUFS or be made available as separate technical memoranda.

C.14. Response: The regional air modeling is part of the ongoing Remedial Investigation at the Atlas Mine and Johns-Manville Coalinga Mill Superfund Sites. Details of this modeling will be presented in the RI for those Sites. EPA did not rely on the details of the regional air monitoring in selecting a remedy for the City of Coalinga Site.

C.15. Comment: VMMC commented that the screening of feasible alternatives in the OUFS was incomplete.

C.15. Response: EPA has determined that the OUFS presents a thorough evaluation of the feasible alternatives. The alternatives and the factors used to evaluate them are described in the ROD. See also Response A.1.4.

C.16. Comment: VMMC commented that detailed design work on the WMU has been proceeding before public comments on the OUFS were received.

C.16. Response: The ROD is a conceptual document that describes a remedial alternative in general terms. A PRP remains free to begin design work at their own expense and risk at any point. As of the date of ROD signature, no agreement has been entered into between EPA and any PRP which authorizes work on the remedial design.

C.17. Comment: Atlas Minerals Corporation commented that it was interested in participating in the process of cleaning up asbestos and nickel contaminated material in Coalinga.

C.17. Response: EPA will deal with the issue of PRP participation in the clean up process in the enforcement process. Participation is not relevant to selection of remedy.

C.18. Comment: Atlas Minerals asked how many PRPs had entered into Consent Agreements concerning this Site and which ones were involved in preparation of the OUFS.

C.18. Response: To date no parties have entered into any agreements with with EPA regarding the Site. EPA has sent letters to eighteen PRPs inviting them to present good faith offers to and negotiate settlements with EPA. Negotiations are ongoing at this time. SPTC conducted a Site Characterization and prepared the OUFS for the Site with EPA oversight, pursuant to an Administrative Order issued to them by EPA.

C.19. Atlas Mineral Division of Atlas Corporation raised the following questions in a 24 page letter, from Konrad W. Harper of Simpson Thacher to Jon K. Wactor of EPA, dated March 23, 1989:

C.19.a. Comment: Do the data, within analytical and sampling error, demonstrate that the 210 West Glenn Street property currently is contaminated with asbestos generated by historical warehouse activities.

C.19.a. Response: The Administrative Record contains data which demonstrates that the West Glenn Street property is contaminated with asbestos in excess of 1 area % and up to 80 area % by PLM. The history of the Site indicates that the asbestos contamination at the Site is a result of human activity, including activity at the historic Atlas warehouse and distribution center.

C.19.b. Comment: Is the Glenn Street property posing an unacceptable asbestos health risk?

C.19.b. Response: Yes. The high levels of asbestos present on the property post an unacceptable health risk, especially through the inhalation pathway. The ROD and other documents in the Administrative Record elaborate on the nature of this risk.

C.19.c. Comment: Is remediation of the Glenn Street property necessary?

C.19.c. Response: Yes. Remediation of the contamination at the property is necessary to protect human health and the environment.

C.19.d. Comment: Is remediation of the Glenn Street property cost-effective?

C.19.d. Response: CERCLA Section 121(a) requires that the response action be cost-effective. The cost-effectiveness of the remedy selected for this Site is documented in the ROD and the Administrative Record.

C.19.e. Comment: Could the asbestos detected at the Site be asbestos wind-blown from other locations or asbestos resulting from activities at the Site since 1966?

C.19.e. Response: Evidence collected by EPA and contained in the Administrative Record indicates that it is extremely unlikely that the asbestos at the Site could have been blown there from other locations. Samples were taken at the Site with concentrations of asbestos as high as 98 area % by PLM. On the Glenn Street property concentrations as high as 80 area % by PLM were found. Activities subsequent to 1966 may have contributed to some of the contamination in some parts of the Site.

C.19.f. Comment: Why is the WMU designed above grade?

C.19.f. Response: The WMU was originally designed to be above grade in order to maximize drainage. The ROD requires the WMU to be constructed to be as close to grade as is feasible.

C.19.g. Comment: Is the WMU containment structure, as designed, necessary?

C.19.g. Response: Yes. Some of the design criteria are required by ARARs. The technical bases for other design criteria can be found in the Administrative Record. See correspondence with the Regional Water Quality Control Board throughout the Administrative Record.

C.19.h. Comment: Why is the WMU containment structure not located in existing rights of way

C.19.h. Response: See Response A.1.3.

C.19.i. Comment: Why did EPA not discuss the preferred alternative prior to the public meeting?

C.19.i. Response: EPA did discuss the preferred alternative (i.e. the proposed plan) in the fact sheet that it distributed 13 days prior to the public meeting to all parties who had expressed an interest in the Site. Furthermore, this alternative was discussed in detail with many of the members of the Coalinga City Counsel, at previous City Counsel meetings, and in meetings with all known PRPs, including representatives of Atlas, prior to the start of the public comment period.

C.19.j. Comment: Why is the public comment period extremely limited?

C.19.j. Response: The original public comment period was limited to expedite final clean up of a substantial endangerment to public health. EPA extended the public comment period to 43 days, which is longer than that provided at many other sites. The 43 day period provided a reasonable opportunity for public comment.

C.19.k. Comment: What is meant by the short and long term effectiveness of the preferred alternative as discussed?

C.19.k. Response: The meaning of short and long term effectiveness of a remedy is discussed in A Guide to Developing Superfund Records of Decision (July 1988). "Short term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved." P.3 "Long term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met." P.3.

C.19.l. Comment: What are the current regional and site-specific human and environmental risks, and can they be quantified?

C.19.l. Response: The risks at the Site and the problems with quantifying them are accurately are discussed in the ROD, including Appendix 1, and the Administrative Record. See also, Response C.4.

C.19.m. Comment: After implementing the preferred alternative plan, what reduction in human and environmental risks would be realized?

C.19.m. Response: The risks at the Site and the problems with accurately quantifying any reduction in risk as a result of the remedy are discussed in the ROD and Administrative Record. The risk associated with potential exposure to extremely rich asbestos ore waste will be significantly reduced. See also Response C.4.

C.19.n. Comment: What environmental and human benefits will be achieved with the implementation of the preferred alternative?

C.19.n. Response: The preferred alternative will contain the hazardous substances under an impermeable cap. Human health and the environment will be protected from further contact with the contaminants.

C.19.o. Comment: After the preferred alternative is implemented, what quantifiable and effective reduction in toxicity risk or mobility of contaminants will be achieved?

C.19.o. Response: See Responses C.19.m and C.19.n, above, regarding the difficulty of quantifying risks at the Site. The remedy will not use treatment to reduce toxicity or mobility but the selected remedy does effectively reduce the mobility of the contaminants through containment. The risk of exposure to hazardous substances is also effectively reduced by the selected remedy.

C.19.p. Comment: What are the itemized costs associated with implementing each of the evaluated alternatives?

C.19.p. Response: The estimated costs for the evaluated alternatives are as follows:

a) no action:	negligible
b) Removal of waste to an abandoned mine site:	$9 million
c) Soil cover in place:	$600,000 to $800,000
d) Disposal at an off-site landfill:	$5.5 million
e) Disposal at an on-site landfill:	$2.5 million

The high cost of removal of the waste to an abandoned mine site is due to the cost of building roads to the mine site. The high cost of disposal at an off-site landfill is a result of the fees for disposal at such landfills. The cost for disposal at an on-site landfill is for construction, including labor, and operation and maintenance. See also, Responses C.19.ccc and C.19.s.

C.19.r. Comment: What are the detailed plans for implementing the preferred alternative?

C.19.r. Response: A conceptual design is included in Design Report, Asbestos Waste Management Unit, SPTC, Administrative Record Doc. # 624. Final Design will be approved by EPA in the future context of this case.

C.19.s. Comment: What criteria were used to estimate the costs to implement the preferred remediation plan?

C.19.s. Response: Specific criteria included the costs of meeting ARARs, local labor rates, materials for construction of the WMU, labor rates for workers in level C protection, water rates, and costs of water trucks and enclosed trucks. Guidance For Conducting Remedial Investigations and Feasibility Studies Under CERCLA (October, 1988), Evaluating Cover Systems for Solid and

Hazardous Wastes (September 1982), SW-867 (EPA-D-03), and Design, Construction and Maintenance of Cover Systems for Hazardous Wastes: An Engineering Guidance Document, (EPA 600-2-87-039).

C.19.t. Comment: What are the itemized costs for conducting the technical studies by EPA and SPTCo?

C.19.t. Response: The itemization of these costs is not relevant to EPA's selection of the remedy at this Site. The concern of this PRP with respect to specific past costs will be dealt with in the enforcement context, as is appropriate.

C.19.u. Comment: Atlas states that the literature tends to support the conclusions that the health risks of short fiber asbestos are less than those of long fiber asbestos and that such risks are less for chrysotile asbestos than for other forms of asbestos.

C.19.u. Response: EPA considers short fiber asbestos and long fiber asbestos to be equally carcinogenic; ample evidence in the Administrative Record supports this view. EPA disagrees that the literature supports an opposite view. The recent Asbestos Ban Rule specifically supports EPA's position in this regard. See Administrative Record Document # 1105.

C.19.v. Comment: What are the regional asbestos health issues?

C.19.v. Response: The ROD and documents in the Administrative Record explain the relationship between the regional health issues and the Site. The Remedial Investigation for the Atlas Mine Site further addresses these issues; a complete understanding of all region-wide issues is not necessary to select a remedy to address the immediate health risk at this Operable Unit.

C.19.w. Comment: What are the asbestos regional and local background concentration levels?

C.19.w. Response: Background concentration levels vary depending on proximity to the New Idria Serpentine Mass, meteorological conditions, human dust generation activities, and other factors. Regional air monitoring indicated elevated levels of asbestos in ambient air samples collected in Coalinga compared to background levels collected in Hanford, California. The detailed data on these levels are contained in the Administrative Record.

C.19.x. Comment: What health risks are associated with short-fiber asbestos? Does the chrysotile asbestos found in the Coalinga region induce an unacceptable health risk? Is the chrysotile asbestos carcinogenic?

C.19.x. Response: Asbestos is a known human carcinogen. Although there is substantial disagreement in the scientific community over which forms of asbestos are the most hazardous and carcinogenic, EPA has determined, based on the best available evidence, that the asbestos at the Site presents an imminent and substantial endangerment to human health and the environment that requires remediation. See also, Response C.19.u.

C.19.y. Comment: Are short asbestos fibers less of a health risk than long asbestos fibers, and if so, what health risk has been introduced by historical warehouse activities in the City of Coalinga?

C.19.y. Response: See Responses C.19.u and C.19.x. for the answer to the first part of this question. The apportionment of responsibility among Potentially Responsible Parties is not directly relevant to EPA's selection of the remedy. EPA will address these enforcement related concerns in the enforcement context. See also, Response C.19.jjj.

C.19.z. Comment: What are the historical and current asbestos health risks in the City of Coalinga?

C.19.z. Response: See Responses C.19.y, C.19.x, C.19.u, and C.4, as well as Appendix 1 to the ROD.

C.19.aa. Comment: What exposure and health risks associated with the asbestos are found within the study area?

C.19.aa. Response: The main pathway of exposure to asbestos at the Site is through inhalation, although ingestion also represents some risk. To the best of EPA's knowledge, epidemiological surveys have not been performed in the Coalinga area.

C.19.bb. Comment: Does the preferred remediation plan mitigate asbestos exposure as well as unacceptable health risks?

C.19.cc. Response: The proposed plan mitigates unacceptable health risks by mitigating exposure to asbestos.

C.19.dd. Comment: Can a cost-effective remediation plan be implemented, and can the plan be justified?

C.19.dd. Response: Yes. The proposed plan is fully implementable from a technical standpoint. As determined in the ROD, the plan meets all the requirements of CERCLA and the National Contingency Plan, including cost-effectiveness.

C.19.ee. Comment: What is the background nickel concentration?

C.19.ee. Response: Background concentrations of nickel in Hanford, California were measured at 70 ppm, using the TTLC Wet Extraction Test. Western soils have been documented to contain 16 ppm nickel. Background levels vary depending on proximity to the New Idria Serpentine Mass, meteorological conditions, human dust generation activities, and other factors.

C.19.ff. Comment: Is nickel an environmental health risk in the City of Coalinga?

C.19.ff. Response: Yes. The major environmental health risk from nickel in the City of Coalinga is from inhalation of nickel-laden dust. See also, Toxological Profile for Nickel, Admin. Record Doc. # 668.

C.19.gg. Comment: Is the asbestos contaminated with nickel or is nickel naturally occurring?

C.19.gg. Response: Data suggest that the nickel is a by-product of the asbestos milling process. Chrysotile and nickel both occur naturally in certain rock formations but their occurrence at the Site is not natural. Nickel is a "contaminant" within the meaning of CERCLA Section 101(33).

C.19.hh. Comment: Is nickel elevated because of oil drilling and production activities in and adjacent to the City of Coalinga? Are the nickel concentrations related to Coalinga's petroleum industry?

C.19.hh. Response: No, it is extremely unlikely that the nickel detected in the asbestos contaminated material is a result of any activity related to oil production in Coalinga. If there were a connection, the nickel would be randomly distributed at the Site and not concentrated only where the asbestos contaminated material is present.

C.19.ii. Comment: Is nickel mobile in the existing environment?

C.19.ii. Response: Unless the impounded waste is contacted with a low pH liquid, soluble nickel is not expected to be mobile in the existing environment. However, nickel-laden dust or soil at the Site can be entrained into the atmosphere if soil or dust is disturbed. Therefore, nickel is mobile in this media at the Site.

C.19.jj. Comment: Is nickel complexed with minerals (e.g., nickel chloride, nickel sulfate) other than asbestos?

C.19.jj. Response: The Wet Extraction Test in this context does not indicate the complexing relationship of the nickel but simply the concentration of the extractable nickel present.

C.19.kk. Comment: Does the nickel concentration pose an unacceptable human health and environmental risk?

C.19.kk. Response: Yes.

C.19.ll. Comment: If the preferred plan is implemented, will health risks be cost-effectively reduced?

C.19.ll. Response: Yes. CERCLA Section 121 requires that the selected response action be cost-effective and protective of public health and the environment. In the ROD, the Regional Administrator determined, based on the Administrative Record, that the selected alternative is a cost-effective means to protect public health and the environment.

C.19.mm. Comment: What are the health risk exposures/pathways related to nickel concentrations?

C.19.mm. Response: At the Site, exposure via ingestion and inhalation of nickel dust are the exposure pathways of concern.

C.19.nn. Comment: Are high nickel releases related to chromite ore warehouse activities?

C.19.nn. Response: EPA is aware of no evidence that this is the case.

C.19.oo. Comment: Was a chemical pathway data analysis performed?

C.19.oo. Response: See Responses A.1.5, A.1.6, C.2, and C.4.

C.19.pp. Comment: Was a contaminant/leachate water balance analysis performed which demonstrated percolation through the impermeable asbestos? If so, did the results show an unacceptable human health or environmental risk?

C.19.pp. Response: No, a contaminant/leachate water balance analysis was not performed. However, a detailed hydrologic study was done to assess vertical conductivity between the surface and the upper aquifer. This included data on precipitation/evaporation rates, permeability of individual subsurface layers and characteristics of fluid movement in soils. This study concluded that even without an impermeable cap, the potential for movement of fluid from the impounded waste to the upper aquifer was remote. Asbestos is not impermeable. Asbestos is not soluble in water and is not expected to move out of the WMU into the subsurface. The concern of the EPA and the RWQCB with respect to subsurface contamination is the possibility of movement of soluble nickel in percolated water. The impermeable cap will prevent water from entering the impounded waste, making the formation of nickel containing leachate unlikely. Further, EPA and RWQCB are confident that the WMU is adequately isolated from the upper aquifer by several impermeable clay layers in the subsurface.

C.19.qq. Comment: What toxicological evaluations have been performed, and what were the conclusions?

C.19.qq. Response: See Response C.4. and the nickel and asbestos toxicity profiles in the Administrative Record.

C.19.rr. Comment: What design components of the WMU are attributable to the disposal of nickel, and what are the associated costs?

C.19.rr. Response: The low permeability of the cap and the neutron probes to detect moisture within the the impounded waste are design components attributable to the presence of nickel. The exact costs attributable to these design components cannot be determined until final design is approved by EPA.

C.19.ss. Comment: Atlas comments that a waiver from ARARs should have been considered, and that more data should have been collected to justify such a waiver.

C.19.ss. Response: EPA determined that a waiver from ARARs was not appropriate for this Site. Atlas does not indicate why a waiver would be appropriate or even what waiver might be appropriate, so EPA is constrained from replying in any more detail.

C.19.tt. Comment: Why are asbestos and nickel relationships not adequately discussed?

C.19.tt. Response: The relationship between asbestos and nickel is adequately discussed in the OUFS for purposes of remedy selection. A positive correlation between the asbestos contamination and the presence of nickel at the Site is demonstrated by the data contained and discussed in the Hazardous Substance Containment Report which is included in the Administrative Record.

C.19.uu. Comment: In addition to background concentrations, what are the other sources for nickel levels found in the soils?

C.19.uu. Response: EPA has determined that nickel levels in excess of background at the Site are a by-product of the asbestos milling process.

C.19.vv. Comment: Will nickel have an impact on drinking water supplies?

C.19.vv. Response: The City of Coalinga gets its drinking water from the California Aqueduct; nickel is not expected to impact drinking water supplies. See Response A.1.5. However, the nickel could have a negative impact on other beneficial uses of the aquifer, including irrigation. See correspondence with the Regional Water Quality Control Board throughout the Administrative Record.

C.19.ww. Comment: Will nickel have an adverse impact on the water quality in the uppermost aquifer?

C.19.ww. Response: See Responses A.1.5. and C.19.vv.

C.19.xx. Comment: What are the cost-effective attributes associated with the design of the preferred mitigation plan?

C.19.xx. Response: The OUFS and the ROD both describe the cost-effectiveness of the proposed plan.

C.19.yy. Comment: What chemical pathways of nickel have been demonstrated that will result in quantifiable contamination to the environment and a quantifiable health risk?

C.19.yy. Response: It is unclear what is meant by chemical pathways of nickel in this context. EPA assumed that the commenter meant to refer to exposure pathways. The exposure pathways of concern are inhalation of nickel-laden dust and soils, ingestion of nickel-laden dust and soils, and ingestion of nickel-laden ground water. The proposed plan will mitigate exposure through all of these potential exposure pathways.

C.19.zz. Comment: What is the chemical fate of nickel in the existing environment?

C.19.zz. Response: It is unclear what is meant by chemical fate of nickel in this context. The concerns regarding nickel at this Site include leaching of soluble nickel into the ground water and entrainment of nickel contaminated dust and soil into the air.

C.19.aaa. Comment: The Administrative Record does not show technical comments and acceptance of the RI/FS and OUFS by the State of California.

C.19.aaa. Response: The State has concurred in the selected remedy. See Admin. Record Doc. # 1094.

C.19.bbb. Comment: Atlas comments that the City of Coalinga has not approved or accepted the preferred containment plan, and alleges that "[t]he City of Coalinga, as represented by its citizenry and public officials at the February 22, 1989 public meeting, disapproved the EPA administrative and technical processes used to prepare the preferred containment plan."

C.19.bbb. Response: Community acceptance of the remedy is not a threshold or primary balancing criteria, rather it is a modifying criteria. See A Guide to Developing Superfund records of Decision (July 1988) page 3. EPA's consideration of community concerns is described in the ROD. The procedures followed by EPA in selecting the remedy for this Site were in full compliance with CERCLA Section 117's requirements regarding public participation. EPA also consulted with the City throughout the process of studying the Site and selecting a remedy, beyond the minimum requirements set forth in Section 117.

C.19.ccc. Comment: Atlas alleges that the following information is "missing" from the RI/FS Administrative Record:

1) Detailed description of the data which define contaminant sources and their pathways of migration, as well as potential sources of contaminants.

2) A risk assessment which determines the contaminants of concern, their toxicity, potential exposure levels affecting potential receptors, mechanisms of exposure, and potential effects.

3) Detailed costs for all evaluated remediation alternatives.

4) Detailed listing of all PRPs and the justification for including each of them.

5) Detailed itemization of all existing landowners and the records regarding historical ownership.

6) Detailed itemization of all existing tenants and the records regarding historical tenancy.

7) Detailed itemization of study costs.

C.19.ccc. Response: For a response to the issues raised by Subparts 1 and 2 of this Comment, see Response C.4. With respect to Subpart 3 of this Comment, the total cost of each alternative is what is considered in determining cost-effectiveness, rather than a detailed cost breakdown. Subparts 4 through 7 of this Comment are not appropriately raised in this context because they do not relate to the basis for selection of the remedy at this Site. The Administrative Record was prepared pursuant to CERCLA Section 113(k)(2) and contains the information "on which the President [or the President's delegatee, EPA] will base the selection of removal actions and on which judicial review of removal actions will be based." CERCLA Section 113(k)(2)(A). The opportunity to comment, provided pursuant to CERCLA Section 113(k)(2)(B)(ii) is an "opportunity to comment and provide information regarding the plan." The questions raised by this portion of the Comment are all enforcement related and are more appropriately dealt with in the enforcement context, not in comments on the proposed plan.

C.19.ddd. Comment: The only copies of the Administrative Record readily available to Atlas were located in the EPA Region IX library and in the public library for the City of Coalinga. Atlas did not receive a copy until March 1989.

C.19.ddd. Response: Pursuant to Section 113(k)(1) of CERCLA, EPA is required to keep a copy of the Administrative Record at or near the Site. EPA not only complied with this statutory requirement, but also made a copy of the Administrative Record available at the EPA Regional Office. Furthermore, EPA staff supplied copies of many of the principle documents, as well as much of the relevant information, to Atlas' representatives in meetings prior to the start of the public comment period.

C.19.eee. Comment: Atlas alleges that EPA "refused access" to technical data used by EPA, and refers to a Freedom of Information Act ("FOIA") they "filed . . . with EPA on July 3, 1988." Atlas also states that EPA failed to provide it with a copy of the transcript of the February 22, 1989 public meeting.

C.19.eee. Response: Atlas granted EPA extensions on the time to comply with the FOIA request. Also, Atlas has specific rights under FOIA, including appeal rights, to protect any concerns that it had or has about Region 9's response to FOIA requests or other requests for documents. Furthermore, EPA staff supplied copies of many of the principle documents, as well as much of the relevant information, to Atlas' representatives in meetings prior to the start of the public comment period. Without further elaboration by Atlas regarding its concerns about access to data, EPA cannot give a more specific response to this comment. EPA complied with CERCLA Section 117's requirements regarding participation by the public, including Potentially Responsible Parties. See Responses C.19.ddd., and C.19.j.

C.19.fff. Comment: Atlas alleges that "[t]he technical data used to generate EPA's . . . RI/FS have been collected over the last ten years." (page two of Atlas' letter); Atlas comments that it was not given an opportunity to participate in EPA's data collection activities.

C.19.fff. Response: It is unclear what document Atlas is referring to in this comment. The RI/FS for the Atlas Mine Site is still ongoing. The data for the Operable Unit Feasibility Study for this Site was generated over the last two years. Not until the public meeting of March 22, 1989 did Atlas offer to perform or take part in response actions at the Site. Atlas was notified of its status as a Potentially Responsible Party in March of 1988. Prior to the PRP search activities, the whereabouts of Atlas were unknown to EPA.

C.19.ggg. Comment: Atlas alleges that it was not given an opportunity to participate in the design of a cost-effective remediation plan.

C.19.ggg. Response: Atlas was notified of its status as a PRP in March of 1988. At a minimum, Atlas has had an opportunity to participate in the selection of a cost-effective remedy through the submission of its 24 page comment letter; this opportunity was provided pursuant to Section 113(k)(2)(B) of CERCLA.

C.19.hhh. Comment: Atlas alleges that in the 1980s EPA conducted an investigation of the asbestos issues in the City of Coalinga and determined that asbestos must be removed.

C.19.hhh. Response: This comment misstates the facts. Regional air monitoring in the Coalinga area in 1986 and 1987 indicated elevated levels of airborne asbestos in the City of Coalinga. Based on this information, EPA initiated an investigation in the City of Coalinga to determine if localized sources were responsible for these elevated ambient air levels. During the course of this investigation, several hot spots of asbestos contamination were identified in the area of the Site. EPA did not decide to do a complete remedy at the Site until this investigation was completed.

C.19.iii. Comment: Atlas alleges that asbestos concentrations are less than 1 area % in most samples for the Glenn Street portion of the Site, and that only one quality assurance sample showed an asbestos concentration as high as 2 % TEM. Atlas further alleged that the initial results showed less that 1 area % concentration within the immediate area of the Atlas warehouse.

C.19.iii. Response: The detailed Site investigation indicated that the Glenn Street portion of the Site is contaminated with asbestos at levels exceeding two area percent and up to 80 area percent by PLM. These data are included in the Hazardous Substance Containment Report which is in the Administrative Record. The levels of asbestos contamination found in the initial Site investigation were high enough to require further study, which indicated dangerously high levels of asbestos present. The Glenn Street Property is the portion of the Site closest to residential areas.

C.19.jjj. Comment: Beginning in the middle of page 21 of their letter and continuing up to the concluding paragraph on page 24, Atlas includes a discussion and questions which are entirely enforcement related.

C.19.jjj. Response: These comments do not address the bases for EPA's remedy selection.As explained in Response C.19.ccc above, the purpose of this public comment period is to provide an opportunity for interested members of the public to comment and provide information regarding the proposed plan. See CERCLA Section 113(k)(2)(B)(ii). This is an inappropriate context for a PRP to seek information regarding enforcement-related topics.

REVIEW OF ASBESTOS ANALYTICAL METHODS

I. Asbestos Analytical Techniques

There are three commonly accepted analytical methods used to measure asbestos. They are:

1) Phase Contrast Microscopy ("PCM"): An optical technique useful in examining minute particles.

2) Polarized Light Microscopy ("PLM"): An optical technique that uses polarized light to identify minerals.

3) Transmission Electron Microscopy ("TEM"): A technique using excitation of electrons to achieve extremely high resolution of asbestos fibers too small to be resolved using optical methods.

A brief description, including the advantages and disadvantages of each technique, is presented below.

A. Phase Contrast Microscopy

Phase contrast microscopy ("PCM") is a method of optical microscopy that is commonly used to analyze air samples collected in the work place (e.g. in enclosed spaces). PCM translates differences in the phase of light transmitted or reflected by the object into differences of intensity in the image. The method is better suited to analysis of work place air than ambient air because in the work place one encounters a relatively large concentration of large bundles of asbestos fibers. Most of the available medical studies of asbestos diseases have measured asbestos using PCM. This is because PCM was the only technique available when most of the occupational studies were done.

The PCM technique has two major limitations concerning its use in the ambient environment. The method cannot detect fibers with diameters of less than 0.2 micrometers. Many fibers in the environment are much smaller than this. Also, PCM does not distinguish between asbestos fibers and other types of fibers. Therefore, in the environment, the PCM fiber count may be completely unrelated to the asbestos fiber content. For these reasons, it is widely accepted that the PCM method is totally unsuitable for measurement of asbestos fibers in ambient atmospheres.

The major advantages of PCM are: i) it is relatively inexpensive and; ii) it is easy to use PCM data to calculate health-based risk in an occupational environment using the models established in the older studies.

B. Polarized Light Microscopy

Polarized Light Microscopy ("PLM") is the EPA-approved method of analysis for bulk insulation samples. The PLM technique is relatively quick (1/2 hour/sample) and provides a reliable method to: (1) identify all asbestos types, (2) distinguish between asbestos and other fibrous and non-fibrous minerals and (3) identify most non-asbestos components of samples. The resolution capacity of PLM is 200x to 400x magnification. Another advantage of PLM is that it can be performed for a relatively low cost.

There are two ways to do PLM analysis, the point counting method and the field comparison method. The point counting method uses a superimposed grid (gravicule) with 100 points. The operator counts the points where asbestos is present. The method (point count) involves the preparation of eight slides, each of which can be viewed at 100 possible points, to establish the presence or absence of asbestos at 50 points on each slide. The result is recorded and reported as area percent based on the number of positive points. The following format is used for determination:

Area percent = a/n (100)
where:
a = number of points with asbestos fibers present
n = number of non-empty points counted.

The field comparison method, also called "visual estimation" or the 2-minute method with the stereobinocular light microscope, is used to quantify a large sample (e.g., 1 ounce) using the microscope at 30-40x. The operator estimates the homogeneity of the mixture and estimates the percentage of each individual fibrous component.

The disadvantages associated with PLM include:

- o Asbestos content determination is usually done by visual estimate (field comparison) or point counting, and is thus qualitative or at best, semi-quantitive; concentration is expressed as the ratio of asbestos to non -asbestos particles or percent by area.
- o Small fiber identification is difficult because certain optical properties (birefringence and the angle of extinction) are hard to determine in small fibers.
- o The smallest fibers that can be observed are approximately 0.34 micron in diameter; fibers this small, though observable, cannot usually be identified for mineral type.
- o Highly skilled analysts are required, particularly in view of the subjective nature of the determinations.
- o The quantitative limit of detection is 1 area percent.

Using PLM to identify asbestos in soils can be difficult because soils are subjected to erosion and weathering; asbestos bundles become separated and broken into smaller, possibly sub-optical, sizes much more quickly than fiber bundles in relatively undisturbed insulating materials. Asbestos fibers may also be dispersed by wind and by seasonal flooding. Therefore, a sizeable fraction of the asbestos fibers in soil could be below optical resolution. On the other hand, PLM is the only method of measuring asbestos with an EPA approved methodology for sampling and analysis. Therefore, it is the one analytical method that can be adequately controlled in a quality assurance/quality control plan. Also it is significantly less expensive than TEM analysis.

C. Transmission Electron Microscopy

Transmission electron microscopy ("TEM") is the most powerful analytical method available for measuring asbestos. TEM can be used for air, water, or soil analysis. It is the preferred instrumental technique for measuring asbestos in ambient atmosphere since it incorporates the most powerful combinations of identification methods. TEM analysis uses electron microscopy, at magnifications of 10,000 to 50,000 times, to detect asbestos to the single fibril level. Fibers as small as 0.2 nanometers in diameters can be identified. Besides the transmission electron microscope, which allows the operator to locate very small fibers, this technique can also utilize two mineral identification tools. These are Selected Area Electron Diffraction ("SAED") and Energy Dispersive X-ray Analyzer ("EDXA"). Using these tools, the operator can identify the mineral type from a single point on the specimen.

The disadvantages associated with TEM include the following:

- No widely accepted TEM method is available for the analysis of asbestos in soils, making it difficult to correlate interlaboratory data. Sample preparation methods are not standard among workers, making the comparison of results between sites or laboratories very difficult or meaningless.

- Analysis requires a minimum of 6 to 8 hours over 2 to 3 days. Highly skilled analysts are required and large differences in results can occur due to operator variance. TEM analysis is extremely expensive, over 20 times the per sample cost of optical methods.

- Sample size is very small. Therefore, data must be extrapolated to a great extent to adequately characterize a large site.

- Typically, total fibers are counted. Sample preparation (i.e., grinding) destroys the fiber size distribution.

TEM sample preparation alters the soil matrix. This is significant because the sample is dispersed into very fine particles before it is put onto a filter for analysis. Since asbestos occurs in clusters and bundles as well as fibers, the sample preparation process (in the case of soil) can destroy the structure of those forms and produce a very large number of individual fibers of small size. Although total fibers are counted as part of the TEM analysis, these results must be converted to weight percent, using data on length, width, and density. This conversion to mass is necessary due to the sample preparation grinding process, which artificially increases the fiber count. How the TEM weight percent compares with air emissions and risk tables has not been standardized by government or industry. Therefore, interpretation of soil data results relative to air samples and/or risk charts is very difficult, at best.

II. Problems with Using Asbestos Data in Quantifying Risk

Although the role of asbestos as a cause of cancer is clear, the ways in which fibers cause disease are not well understood, and this has complicated efforts to measure asbestos successfully. Asbestos researchers have not agreed upon which attributes of asbestos are important to measure to assess risk, including size and shape of individual fibers, number of fibers, total mass of fibers, inclusion of asbestos bundles, clusters, and matrix debris in the fiber count, and asbestos mineralogical type. For example, most researchers think that longer, thinner asbestos fibers (those longer than 5 microns in length with an aspect ratio greater than 3 to 1) are more carcinogenic, i.e., The "Stanton Hypothesis". However, other researchers question this approach, suggesting that both long and short fibers may be biologically active. In addition to fiber dimension, surface chemistry of the asbestos fibers may play a role in causing disease. Further, there is disagreement whether mineral type is a factor in disease causation. Some would argue that chrysotile asbestos may partially dissolve in weakly acidic environments, facilitating fiber clearance from the lung. However, EPA's view is that all asbestos mineral types are equally carcinogenic.

To compound the problem, analysis of ambient samples for asbestos is much more difficult than occupational or work place samples, because the concentration of asbestos in the environment is much lower. Asbestos fibers found in ambient air are typically too short and thin to be detected by conventional microscopes, and may be agglomerated with other particulate matter so that they are masked or hidden. Further, although EPA has attempted to standardize asbestos analytical techniques, differences in sample handling, preparation, instrument capabilities, operator proficiency, and counting procedures make it extremely difficult to compare results from different laboratories. In short, accurate measurement of asbestos is impeded by many factors, greatly complicating any estimates of environmental risk. For this reason clean up levels have been established using the best available analytical methods for which an approved methodology exists. The following discussion summarizes the rationale behind choosing the one area percent by PLM clean up level.

III. Clean Up Goals for the City of Coalinga Operable Unit

Problems with asbestos analytical techniques make establishing health-based clean up levels very difficult. As mentioned above, the clean up level of one area percent by PLM has been chosen because it is the best available analytical technique for which there is an EPA approved protocol. This is further evidenced by the fact that EPA chose to utilize PLM as an analytical method under the Asbestos Hazard Emergency Response Act ("AHERA"). EPA has chosen the one area percent clean up level for the City of Coalinga Operable Unit because one area percent is the generally accepted detection limit for asbestos in soil using PLM. One area percent by PLM has also been used in the past as an action level in emergency response situations. This level will provide protection to public health and the environment.

Memorandum

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD • CENTRAL VALLEY REGION

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FROM: Michael R. Mangold
Staff Engineer

DATE: 7 April 1989

SIGNATURE: Michael R. Mangold

SUBJECT: DESIGN REPORT, ASBESTOS WASTE MANAGEMENT UNIT, SOUTHERN PACIFIC TRANSPORTATION COMPANY, COALINGA, FRESNO COUNTY

I have reviewed the subject design report as prepared by IT Corporation for Southern Pacific Transportation Company (SPTC). SPTC proposes to construct a waste management unit (WMU) for disposal of Group B mining waste.

Background

SPTC is working with the Environmental Protection Agency (EPA) under a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) order for a mining waste site (approximately 107 acres in area) located in the City of Coalinga. Cleanup of the site will include excavation and removal of an estimated 20,000 ft^3 of asbestos ore and contaminated soils. This waste has been classified as Group B mining waste and will be disposed into an appropriate waste management unit as delineated in Section 2572, Title 23 of the California Code of Regulations (Subchapter 15).

International Technology (IT) Corporation prepared a report characterizing local hydrology and geology for SPTC to be used as the basis for design of the proposed asbestos WMU. The report's objective was to provide information necessary to:

1. Determine whether the wastes should be disposed of as Group A or B mining wastes.
2. Provide a basis for design of the disposal facility.
3. Determine the level of monitoring necessary to satisfy Subchapter 15 requirements.

Following staff's review of the report, the following determinations were made.

1. The mining waste is classified as Group B waste.
2. Clay liner and leachate collection system may be exempted for the proposed unit.

3. Groundwater monitoring could be minimized in favor of a vadose zone monitoring network that incorporates neutron probe technology to detect potential discharges from the WMU.

4. Excavation of the WMU should be monitored to assure that the WMU remains in compliance with Subchapter 15 siting requirements.

Based upon the site characterization and staff's review of applicable or relevant and appropriate requirements (ARARs), the following items were requested.

1. A preconstruction report including construction details and quality assurance and quality control procedures for the excavation, filling, and capping of the proposed WMU.

2. A water quality monitoring plan for the proposed vadose zone monitoring network including locations and details of monitoring points and a plan for implementation of groundwater monitoring.

To this end, SPTC has submitted this report.

Design

The WMU will have a design capacity of 25,000 ft^3. Top surface area of the WMU will be 272 ft. by 222 ft., with a bottom elevation of 671.5 ft. or 20 ft. below the existing ground surface. Side slopes will be constructed at a 3:1 ratio. A 20-foot wide embankment will be constructed around the unit to raise the top level of the WMU to adjacent topography following removal of the contaminated soil in that location. The embankment will have a 2 percent slope to promote runoff away from the WMU.

Closure Plan

Final cover of the landfill will consist of the following (from bottom to top):

*A two-foot foundation layer consisting of waste materials or clean fill compacted to 95 percent of maximum dry density. This layer will be graded at 4 percent slope.

- *A 1/4-inch thick bentonite mat (Claymax, or an equivalent) placed on top of the foundation layer. The report indicates that this mat is an engineered alternative to the prescriptive standard of a one-foot layer of compacted clay having a permeability of 1x10^{-6} cm/s or less.

- *A minimum of one foot of soil cover placed on top of the mat. This layer will be compacted to obtain 95% of maximum dry density.

- *A final layer consisting of 4 inches of concrete asphalt compacted to 92% of the average density of the Maximum Theoretical Specific Gravity. The report states that grading will be at 4 percent to facilitate runoff from the WMU; however, from recent discussions with the EPA, a smaller slope may be used.

Indications are, the area above the WMU might be used as a parking lot or as a long-term storage facility.

As mentioned previously, the report indicates the bentonite mat is an engineered alternative to the prescriptive standard of a layer of compacted clay. Section 2510 (b) of Subchapter 15 states that, "unless otherwise specified, alternatives to construction or prescriptive standards contained in this subchapter may be considered. Alternatives shall only be approved where the discharger demonstrate that:

1. The construction or prescriptive standard is not feasible as provided in subsection (c) of this section.

2. There is a specific engineering alternative that

    (A) is consistent with the performance goal addressed by the particular construction or prescriptive standard and

    (B) affords equivalent protection against water quality impairment."

Subsection (c) states that, "To establish that compliance with prescriptive standards in this subchapter is not feasible for the purposes of subsection (b) of this section, the discharger shall demonstrate that compliance with a prescriptive standard:

1. Is unreasonably and unnecessarily burdensome and will cost substantially more than alternatives which meet the criteria in subsection (b) of this section; or

2. Is impractical and will not promote attainment of applicable performance standards.

Feasibility Issue

The report indicates that a compacted clay layer is not practical for the following reasons:

1. Investigations performed in the area showed that a source of clay is available at 20 feet below existing grade. However, costs for obtaining the clay would be exorbitant.

2. Cost of obtaining the borrow clay from other sources are also extremely expensive due to high transportation costs.

3. Quality of borrow clay from outside sources is questionable and may not be obtainable within the time frame of the project.

Engineering Alternative Issue

The consultant believes that the bentonite mat (Claymax) is consistent with the performance goals addressed by the prescriptive clay liner and provides equivalent protection against water quality impairment. The following reasoning was provided to support this position.

*Permeability tests performed on Claymax by Geoservices Inc., (an independent lab) have demonstrated a permeability of 2×10^{-10} cm/s.

*Based on equivalent seepage velocity, Claymax of 1/4-inch thickness is equal to an infinite thickness of compacted clay liner with a permeability of 1×10^{-6} cm/s.

*Based on equivalent breakthrough time, the 1/4-inch Claymax is equal to at least 2 feet of compacted clay with a permeability of 1×10^{-6} cm/s.

*The Claymax is more flexible than a compacted clay liner and can handle large deformation without causing cracking.

The report further states that Claymax is manufactured under controlled conditions and is readily available to the site. Furthermore, handling and installation of Claymax is easier and faster than compacted clay.

Information on comparison studies (performed by Geoservices, Inc.) between Claymax and a compacted clay liner are included in Appendix F and G of the design report.

Vadose Zone Monitoring

Vadose zone monitoring will exist beneath the site to provide an early detection system for possible migrating contaminants emanating from the landfill. Neutron probes were selected to detect any changes in moisture content directly beneath the site.

Vadose zone monitoring will consist of pulling the probes through two access tubes installed beneath the site. The locations and spacing of the access tubes are illustrated in Drawing No.2 of the design report. The tubes will be spaced 85 feet apart and will be placed 2 feet beneath the bottom of the WMU.

Soils samples will be extracted every 5 feet along the access tube trenches and will be laboratory tested to determine native moisture contents prior to actual installation of the tubes. The locations for the soil samples will coincide with intervals to be used for monitoring with the neutron probes. Prior to any discharge of waste into the WMU, background data will be generated by monitoring with the neutron probe each week for four weeks. After this data is obtained, the monitoring frequency will be decreased to quarterly for a period of one year. If no significant changes in the moisture content are observed after a period of one year, the monitoring frequency will be again decreased to semiannually.

The design report indicates that results from each monitoring event will be compared with results from previous vadose zone monitoring and background data. The report states that in the event that a significant change in moisture content is observed, an assessment of the situation will be initiated and the Regional Water Quality Control Board (RWQCB) will be notified. The report further states that in the event that moisture content increases above 5 percent

WELLS G & H SITE
RESPONSIVENESS SUMMARY
WOBURN, MASSACHUSETTS

September, 1989

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ATTACHMENT A - COMMUNITY RELATIONS ACTIVITIES CONDUCTED AT THE WELLS G & H SITE IN WOBURN, MASSACHUSETTS

ATTACHMENT B - TRANSCRIPT OF THE FEBRUARY 27, 1989 INFORMAL PUBLIC HEARING

PREFACE

The U.S. Environmental Protection Agency (EPA) held a 40-day public comment period from February 10, 1989 to March 21, 1989 to provide an opportunity for interested parties to comment on the Feasibility Study (FS) and the Proposed Plan prepared for the Wells G & H Superfund site in Woburn, Massachusetts. The FS examines and evaluates various options, called remedial alternatives, for addressing soil and groundwater contamination. EPA identified its preliminary recommendation of a preferred alternative for the site cleanup in the Proposed Plan issued on February 1, 1989, before the start of the public comment period.

The purpose of this Responsiveness Summary is to document EPA responses to the comments and questions raised during the public comment period. EPA has considered all of the comments summarized in this document before selecting a final remedial alternative for the contamination at the Wells G & H Superfund site in Woburn, Massachusetts. In addition, based upon public comment on the FS and Proposed Plan, EPA has decided upon a different remedial alternative than was presented in the Proposed Plan. The selected alternative, and the reasons for choosing an alternative that is different from what was originally proposed, are documented in the Record of Decision and are also summarized in the overview.

This Responsiveness Summary is divided into the following sections:

I. Overview - This section briefly outlines the remedial alternatives evaluated in the FS and Proposed Plan, including EPA's initial recommendation of a preferred alternative. This section includes general public reaction to the Proposed Plan and subsequent changes made by EPA to the preferred alternative.

II. Background on Community Involvement and Concerns - A brief history on community interests and concerns regarding the Wells G & H site is presented in this section.

III. Summary of Comments Received During the Public Comment Period and EPA Responses - Written and oral comments from the public, interested parties, and potentially responsible parties (PRPs) on the Feasibility Study (FS) and the Proposed Plan are summarized in this section. EPAs responses are also provided.

IV. Remaining Concerns - Community concerns regarding the design and implementation of EPA's selected remedy are presented in this section.

Attachment A - This attachment provides a list of the community relations activities that EPA has conducted to date at the Wells G & H site.

Attachment B - This attachment provides a transcript of the February 27, 1989 Informal Public Hearing held in Woburn, Massachusetts.

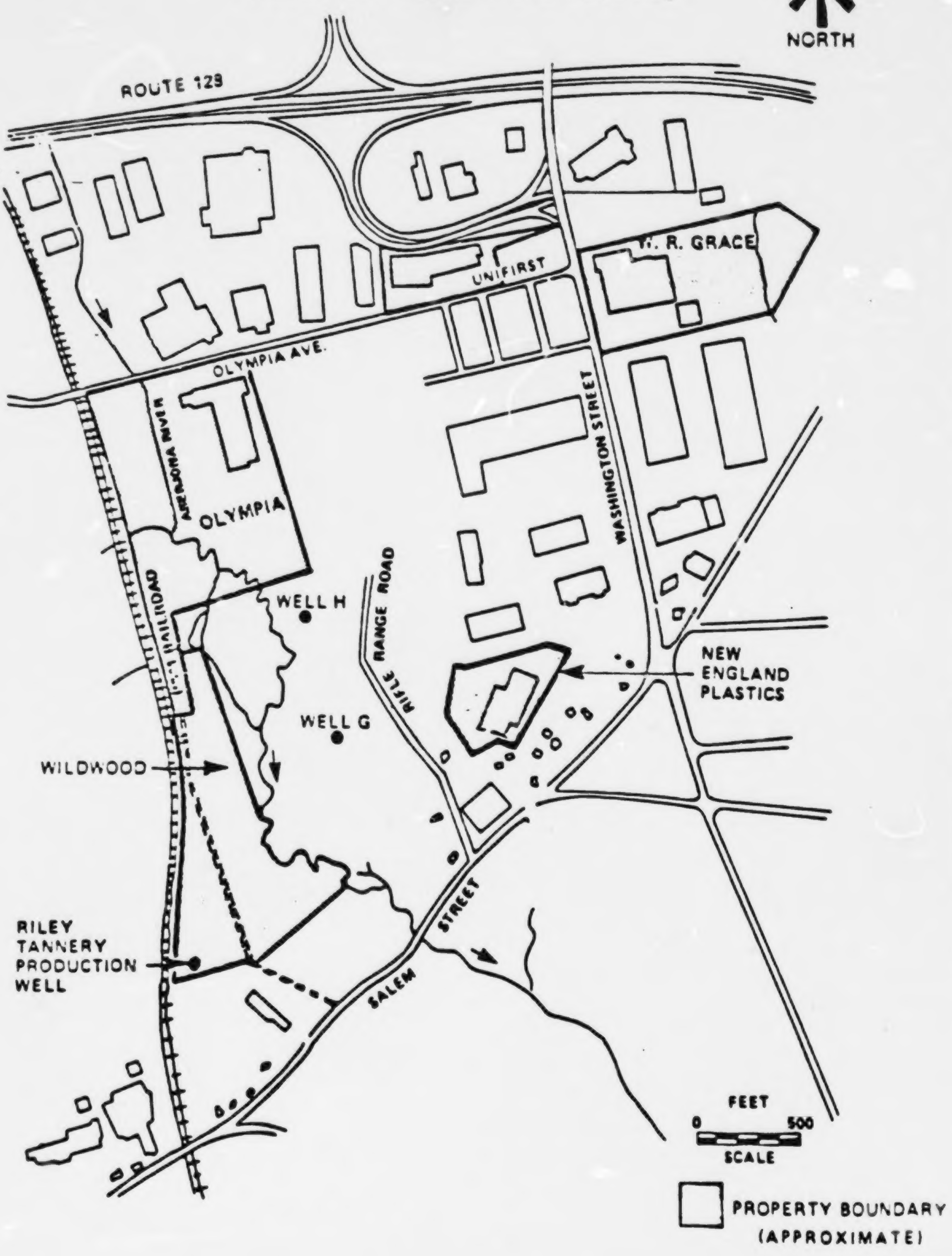
I. OVERVIEW

Using the information gathered during the Remedial Investigation (RI) -- a study that investigates the nature and extent of contamination at the site -- and the Endangerment Assessment (EA)--a study that assesses the potential risks to human health and the environment associated with the site contamination -- EPA identified several objectives for the cleanup of the Wells G & H site. (See Exhibit 1 for a map of the Wells G & H site.) The objectives are:

1. Restore the aquifer that supplied water to Wells G & H to drinking water standards.
2. Stop the introduction of contaminated groundwater from the source areas to the rest of the aquifer.
3. Stop the leaching of soil contaminants to the groundwater.
4. Prevent public contact with contaminated groundwater and soil above the cleanup levels.
5. Protect the natural resources in the area, such as the river and wetlands, from becoming further degraded.
6. Prevent further migration of contaminated groundwater off-site.

After identifying the cleanup objectives, EPA developed and evaluated potential cleanup alternatives. This evaluation, or Feasibility Study (FS), describes the alternatives considered for addressing contamination of soil and groundwater, as well as the criteria EPA used to narrow the list to 9 potential soil remediation alternatives and 4 potential groundwater remediation alternatives. The soil and groundwater cleanup alternatives considered by EPA are described briefly below.

Exhibit 1. Wells G & H Site Map


NORTH
ROUTE 128
W. R. GRACE
UNIFIRST
OLYMPIA AVE.
ABERJONA RIVER
OLYMPIA
WASHINGTON STREET
RAILROAD
WELL H
RIFLE RANGE ROAD
NEW ENGLAND PLASTICS
WELL G
WILDWOOD
RILEY TANNERY PRODUCTION WELL
SALEM STREET
FEET
0
500
SCALE
PROPERTY BOUNDARY (APPROXIMATE)

A. Alternatives Evaluated for Treatment of Soil Contamination

1. Limited action.

The limited action alternative would entail leaving contaminants untreated on-site and monitoring contaminant concentrations and migration through the groundwater beneath the site every year for 30 years. EPA would conduct a more extensive review of the site every five years to determine whether further remedial action is necessary to treat contaminated soil. The limited action alternative would also involve limiting access to the site, limiting site use and the use of groundwater from the site, and conducting public education programs to increase public awareness of the site and restrictions to site use. It is expected that contamination would remain on-site beyond 30 years.

2. Excavation/On-Site Incineration/Backfill On-Site.

This alternative would involve excavating approximately 9,500 cubic yards of contaminated soil at the site and treating the soil in an on-site mobile incinerator. The contaminated soil would be burned at very high temperatures to destroy the contaminants. Because incineration would destroy virtually all of the organic contaminants in the soil, the treated soil would be backfilled to excavated areas.

3. Excavation/Off-Site Incineration/Backfill with Clean Off-Site Soil.

This alternative is similar to Alternative #2, except that contaminated soil would be destroyed at an off-site incineration facility and the excavated areas would be filled with clean off-site soil to regrade the site area.

4. Excavation/On-Site High Temperature Enhanced Volatilization/Backfill On-Site.

This alternative would involve excavating 9,500 cubic yards of contaminated site soils and treating the soils in an on-site mobile treatment unit by high temperature enhanced volatilization. High temperature enhanced volatilization is a type of thermal treatment process that involves mixing the contaminated soil with heated air. This would result in the release and transfer of contaminants such as VOCs, PAHs, PCBs and chlordane from the soil to the air in the unit. The contaminants in the air are then destroyed in a burner. The treated soil would then be backfilled into the excavated areas on-site.

5. Excavation/On-site Supercritical Fluid Extraction/Backfill On-Site.

This alternative would utilize an innovative technology to treat the 9,500 cubic yards of contaminated soil. Contaminated soil from the site would be excavated and mixed with water to create a slurry that would be pumped into a mobile on-site extraction unit. Liquified carbon dioxide introduced to the unit would work as a solvent, dissolving contaminants as it passes over the slurry in the extraction unit under elevated pressure. Treated soil would be backfilled to the excavated areas. The small quantity of extractant containing the contaminants stripped from the soils would be collected and shipped off-site to a commercial incineration facility.

6. Excavation/On-Site Enhanced Volatilization/On-Site Incineration/Backfill On-Site.

This alternative would use enhanced volatilization as described under Alternative #4, except at a lower temperature, to treat approximately 7,600 cubic yards of soil contaminated solely with VOCs. On-site incineration in a mobile unit as described under Alternative #2, would be used to treat approximately 1,900 cubic yards of soil contaminated with a mixture of PAHs, PCBs, VOCs, and pesticides. Because incineration will destroy virtually all of the organic contaminants in the soil, the treated soil would be backfilled to the previously excavated areas.

7. Excavation/On-site Enhanced Volatilization/Off-Site Incineration/Backfill with Treated and Clean Off-Site Soil.

This alternative differs from Alternative #6 only in that soils contaminated with a mixture of organic contaminants would be excavated, and then packaged and shipped off-site for incineration. Since only the soil treated by enhanced volatilization would remain on-site for use as backfill, clean fill would have to be brought in to supplement the treated soils for regrading the excavated areas.

8. In-Situ Volatilization/Excavation/On-Site Incineration/Backfill On-Site.

This alternative is EPA's selected remedy for soil cleanup and is the same preferred alternative presented in the Proposed Plan. In-situ volatilization will be used to treat approximately 7,600 cubic yards of VOC-contaminated soil. Soils contaminated with a mix of PCBs, PAHs, pesticides, and VOCs will be excavated and treated by incineration. Approximately 1,900 cubic yards of soil will be treated by incineration which will permanently destroy virtually all of the contaminants. The treated soils will then be used to backfill excavated areas.

9. In-Situ Volatilization/Excavation/Off-Site Incineration/Backfill With Clean Off-Site Soil.

This alternative is similar to the preferred alternative for soil cleanup, except that the soil with mixed contaminants would be excavated, and then packaged and shipped off-site for incineration. Clean off-site fill would be brought in to regrade the excavated areas.

B. Alternatives to Address Groundwater Contamination

1. Limited Action.

A limited action alternative for groundwater would consist of a long term monitoring program with a review every five years to determine whether further remedial action would be necessary to treat contaminated groundwater. Groundwater use would continue to be restricted. The actual time for groundwater remediation to be accomplished under this alternative would be more than 100 years.

2. Pump and Treat Source Areas.

This alternative would involve pumping groundwater from each of the five source areas and treating it by pretreatment and the use of either air stripping or ultraviolet (UV)/chemical oxidation, at separate treatment plants on each of the properties, or at one central treatment plant. Contaminants in the aquifer in the central area of the site would migrate off-site.

3. Pump and Treat Central Area.

This alternative would involve pumping contaminated groundwater solely from the central area of the site for treatment at one central treatment plant. Contaminated groundwater would first be pretreated and then principally treated by either air stripping, UV/chemical oxidation, or carbon adsorption. This alternative would not only treat contaminated groundwater from the central area, but would also intercept a limited amount of contaminated groundwater that flows from the source areas to the central site area.

4. Pump and Treat Source Areas and the Central Area.

This alternative combines groundwater Alternatives #2 and #3 to provide pumping and treatment of contaminated groundwater from all areas of the site, (the five source areas and the central area). Treatment of groundwater could occur at either six separate treatment plants or at one centrally located treatment plant. Under this alternative, groundwater would first be pretreated and then principally treated by either an air stripper or by UV/chemical oxidation.

C. General Public Reaction to the Proposed Plan and Subsequent Changes Made by EPA to the Preferred Alternative

The February 1989 Proposed Plan presented EPA's preferred alternative. The preferred alternative involved treating the majority of the soils with in-situ volatilization, and treating the remaining soils with incineration. Remediation of the sludge and debris at the Wildwood property would be defined during the design phase of the project. The withdrawal and treatment of contaminated groundwater would be accomplished by pumping groundwater from the aquifer at each of the five source areas of contamination and from the center of the site near Wells G & H to a central treatment plant. Under this alternative, the groundwater would first be pretreated to remove metals, then sent through an air-stripper to remove VOCs. The Proposed Plan should be consulted for a detailed explanation of the preferred alternative.

Many concerns were raised by the public and PRPs during the public comment period (February 10 - March 21, 1989) regarding EPA's preferred alternative. The community in general supported EPA's efforts to cleanup the aquifer. Local officials and some community groups, however, expressed that they would never support the use of the aquifer as a drinking water supply. Another community group predicted that this concern would fade with time and hoped that the aquifer could be used as a drinking water source in the future.

Three of the PRPs and one citizen expressed preference for individual treatment plants. They were concerned that a central treatment facility would necessitate pumping contaminated groundwater through residential and wetland areas. PRPs were concerned that pumping the central area would effect the level of the Aberjona River, the wetlands area, and also draw contaminants from sediments in the Aberjona River into the central area.

After a careful review of the comments and concerns, EPA elected to modify the preferred alternative for the cleanup of contaminated groundwater at the site. The groundwater remedy presented in the Record of Decision (ROD) for the Wells G & H site involves the treatment of contaminated groundwater at each of the five source areas of contamination. Groundwater will be treated at individual treatment plants instead of a central treatment facility. The central area will not be pumped at this time, but a study of the central area will be conducted to determine the most effective method for addressing contamination in the central area.

The central area and the Aberjona River will be addressed as a separate operable unit after completion of the study. EPA believes that addressing the site as operable units will allow immediate cleanup of the sources of contamination while concurrently evaluating other concerns at the site. The alternative selected to remediate contaminated soil at the site remains the same and involves in-situ volatilization, excavation of soils for on-site incineration and backfilling of the excavated areas with the treated soils. The reader is referred to the ROD for additional discussion.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

The 330-acre Wells G & H Superfund site in located in the City of Woburn, Massachusetts approximately 10 miles north of Boston. Community residents began to complain about poor water quality from Wells G & H soon after the wells were activated in 1964 and 1967, respectively. In June 1975, following sampling results showing high concentrations of minerals and salts in the two wells, the Massachusetts Department of Public Health (MDPH) issued a letter to the City recommending that they look for alternative water supply sources and discontinue use of Wells G & H. The City of Woburn began to investigate water supply treatment options for the two wells.

In early May 1979, Woburn police discovered 184 fifty-five gallon drums of industrial waste abandoned on a vacant lot on Mishawum Road in the vicinity of Wells G & H. These drums were subsequently removed. As part of the investigation that followed the discovery of the drums, Wells G & H were tested for hazardous waste contamination by the Massachusetts Department of Environmental Protection (DEP), formerly Massachusetts Department of Environmental Quality Engineering. Samples from the wells showed high concentrations of volatile organic compounds and other chemicals found in industrial solvents. Wells G & H were immediately shut down in May 1979 and the City of Woburn revived an existing agreement with the Massachusetts Water Resources Authority (MWRA) for additional drinking water. Woburn currently receives the majority of its drinking water from its own Horn Pond Aquifer and the remainder from the MWRA.

Community concern about water quality escalated dramatically when Wells G & H were shut down. In October 1979, two Woburn residents who were concerned that water from the two wells could be the cause of the seemingly high number of childhood leukemia and other cancer cases within the City of Woburn, organized a meeting for those with family members or acquaintances with cancer. More than 30 Woburn residents attended this meeting; as a result of the meeting, it was determined that there appeared to be no less than ten cases of childhood leukemia in the City, many of which were located in one particular neighborhood. The specific details of these health problems were reported to MDPH and the Centers for Disease Control in Atlanta.

A number of ongoing community efforts resulted from the initial information gathered at the October 1979 meeting and the closure of Wells G & H. In January 1980, a citizens group, known as "For a Cleaner Environment" (FACE) was established. FACE represents community concerns, conducts research on hazardous waste and public health issues, monitors site activities and lobbies State and Federal agencies on numerous site-related issues. In the early 1980s, several members of FACE joined with the Woburn Citizen's Advisory Committee (CAC), a group formed to oversee activities at the Industri-Plex Superfund Site, also in Woburn. The CAC has been working cooperatively with State and Federal agencies to develop and conduct health and environmental studies related to hazardous waste contamination in the Woburn area.

In 1982, the Wells G & H site was added to EPA's National Priorities List (NPL), making it eligible to receive federal funds for investigation and cleanup under the Superfund program. EPA has since conducted several investigations to characterize the nature and extent of contamination at the site. Also in 1982, eight Woburn families of leukemia victims, filed suit against three companies (W.R. Grace, Beatrice, and UniFirst) alleged to be responsible for well contamination.

Over the past decade, several health studies have been conducted in Woburn to determine the extent of health problems and to ascertain the cause of elevated cancer rates and cases of childhood leukemia, e.g., The Woburn Health Study, (commonly referred to as the Harvard study) conducted by the Harvard School of Public Health. As part of the School's Community Health Improvement Program, an outreach program to educate the public on participatory strategies in public health protection, plans were developed to conduct a health survey of the Woburn population to establish whether childhood leukemia and other possible health effects could be associated with contact with the water from Wells G & H.

In 1986, DEP developed a water distribution model to determine which households had consumed drinking water from Wells G & H, and how much drinking water from these wells had been consumed.

While many community members are concerned with the long term health effects that may result from past consumption of contaminated drinking water, others fear that something in addition to the water from Wells G & H may be responsible for the high incidence of childhood leukemia or that water from Wells G & H may have traveled farther through the city water mains than previously thought.

In June 1984, in an effort to correct the misperception that the municipal water supply was still contaminated, the Woburn Conservation Commission produced a pamphlet entitled "Woburn's Water Supply." This pamphlet, developed with the assistance of FACE, provided information to the community on where Woburn's water originated and how it was distributed and used.

Many residents believe that the responsible parties must pay for both the costs to cleanup the Superfund site and to compensate the families who have suffered as a result of contamination. In 1987, the CAC advised MDPH to conduct additional Woburn-specific studies including: reproductive health; water supply distribution and consumption of drinking water from Wells G & H; and re-analysis of the Harvard School of Public Health Study, the first study that documented a correlation between health problems and consumption of drinking water from Wells G & H.

EPA held a public meeting in November, 1986 to present the results of its recently released Remedial Investigation. Over 80 people attended the meeting during which EPA confirmed that hazardous wastes used by the three companies named in the citizen lawsuit were sources of site contamination. In addition, EPA identified leaking gasoline tanks owned by another company as an additional contamination source. Community concerns expressed at the meeting included expediting negotiations with PRPs to cover cleanup costs, and obtaining the results of EPA's pending EA.

In May 1988, EPA held a special meeting to explain the Feasibility Study process to Woburn residents prior to completing the FS. In conjunction with the release of the FS in February 1989, EPA held a public informational meeting to present EPA's preferred site cleanup alternative. Approximately 30 citizens attended each of the two FS meetings. Local news accounts of the meetings suggested that Woburn residents were well informed about EPA cleanup activities at the site and that many of those who did not attend the Wells G & H meetings had previously received information from EPA at CAC meetings. News articles also stated that many Woburn residents did not want Wells G & H to be restored to meet drinking water quality standards because they would not consume drinking water from these sources.

Participants at the FS meetings expressed concerns about financing site cleanup activities, reliability of groundwater treatment technologies, and potential risks associated with cleanup activities such as soil excavation. Members of the audience urged EPA to maintain ongoing communication with local officials and citizens groups.

The principal community concerns are summarized below:

Long-term Health Effects: Citizens have expressed concern about elevated cancer rates in Woburn, and the possibility that residents will continue to develop serious health problems as a result of exposure to hazardous waste contamination. Citizens have requested that additional health studies be conducted in the City and have asked State and Federal health officials to continue to monitor and evaluate local health problems.

Environmental Monitoring: Woburn residents have indicated support for continued monitoring of water and air quality in the vicinity of drinking water wells supplying local residents with drinking water. In addition, many citizens have expressed a strong desire to have environmental monitoring conducted in local areas where known carcinogens and toxic chemicals are being used (e.g. pesticides, solvents) to avoid further hazardous waste contamination problems.

Future Drinking Water Supply Availability: Many Woburn residents have stated that they will never drink water supplied from Wells G & H. They do not believe that water quality can be "restored" to meet drinking water standards. However, residents are concerned that existing water supply agreements will not keep pace with community needs. Residents want to be informed about water supply options being explored by the City.

Participation in Site Cleanup Decisions: Citizens have stated that they are interested in participating in the decision-making process during the remedial design and remedial action phase of Superfund cleanup. Citizens have stressed that they will not be satisfied with progress reports or site investigation summaries. To this end, in the summer of 1989, FACE submitted a proposal to EPA to obtain a Technical Assistance Grant (TAG). The TAG would allow FACE to hire a consultant to study cleanup options and remedial design alternatives at the Wells G & H site.

Public Image: Citizens have expressed concern about the impacts of publicity about Woburn's Superfund sites and health problems. Citizens have stated that they would like city officials to conduct a public relations campaign about Woburn's safe drinking water supply to educate potential residents and commercial establishments.

III. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES

This responsiveness summary addresses the comments received by EPA concerning the draft FS and Proposed Plan for the Wells G & H Superfund site in Woburn, Massachusetts. Nineteen sets of written comments were received during the public comment period (February 10 - March 21, 1989): eleven from PRPs, two from individual citizens, one from U.S. Congressman Edward J. Markey, one from FACE, one from the Woburn Conservation Commission and three from the Mystic River Watershed Association. The written comments are part of the Administrative Record for the site and may be viewed at the following information repositories:

Woburn Public Library
45 Pleasant St.
Woburn, Ma 01801
(617)-933-0148

EPA Records Center
90 Canal St.
Boston, MA 02114
(617)-573-5729

In addition to the public comment period, EPA held a public hearing on February 27, 1989 to accept oral comments on the Proposed Plan, the Feasibility Study and other reports related to the site. The transcript of this hearing is included as Attachment B.

In this Responsiveness Summary EPA responds to comments related to remedial action for the site which were submitted during the public comment period. During the public comment period, EPA also received comments regarding individual parties' liability for site response costs. As these comments are not related to the selection of the site remedial action, EPA does not believe it is appropriate to address such comments in the Responsiveness Summary for this ROD.

A. Citizen and Other Interested Party Comments

These comments, along with EPA's responses, are summarized and organized into the following categories:

1. Soil Contamination
2. Groundwater Contamination
3. Wetlands Issues
4. Miscellaneous Comments

1. Comments Concerning Soil Contamination

Comment 1. Woburn Conservation Commission remarked that the in-situ volatilization treatment might be ineffective for a wetland area when the water table lies at or near the ground surface. The Commission suggested that perhaps this treatment should be carried out in the wetland area when the water table is seasonally low, or that it be supplemented by treatment of groundwater on the site. The Commission also asked whether treatment of the groundwater would leave VOC residues in the saturated soils.

EPA Response: EPA agrees that the treatment will be ineffective at times when the water table lies at or near the ground surface and therefore attempts will be made to perform treatment during low water table periods. With both the on-site groundwater treatment and soil remediation, VOC contamination will be removed to the levels stated in the ROD and FS.

Comment 2. The Woburn Conservation Commission asked what types of pumps, pipes, and couplings are used to prevent leakage of VOCs into the atmosphere in the in-situ soil volatilization system.

EPA Response: All vapor collected from the volatilization system will be sent through a carbon adsorption unit for removal of VOCs. Details will be developed during design in order to secure a continuous seal. Air monitoring will occur to ensure compliance with air quality standards.

Comment 3. The Woburn Conservation Commission asked if EPA is considering a plan to revegetate treated soils.

EPA Response: As discussed in the FS, all areas where soil is removed in wetlands or floodplains will be restored to grade. In the case of removal of plants or trees, all attempts will be made to restore the wetland community and to revegetate bordering areas.

Comment 4. Congressman Markey stated that the volume of soil being treated seems extremely small given the areal extent of the Wells G & H site, being equivalent to just a fraction of an inch spread across the entire site. In addition, the Representative expressed concerns that the data base used to generate the alternatives in the FS was too small.

EPA Response: Soil and groundwater are two of the media at the Wells G & H site that were found to be contaminated. Groundwater contamination is fairly widespread throughout the site while soil contamination is more limited. Soil sampling was done by a grid method and assumptions had to be made as to the extent of contamination that existed between two points. Additional soil sampling will be conducted during design to refine estimates of the amount of contaminated soil to be removed. This does not imply that the data set used to generate the alternatives in the FS was too small, but rather refers to the need to refine the areas of contamination already found. Data necessary for remedy selection is distinct from data required for remedial design. EPA maintains that the data used to generate the alternatives in the FS was sufficient to select a remedy from the technologies that were considered.

Comment 5. FACE and Citizen Medeiros expressed concerns regarding potential exposure to emissions during soil incineration. FACE expressed concern that emissions from on-site incineration of PCBs and pesticides would endanger residents in nearby neighborhoods and workers in adjacent areas if the incineration process should fail. Medeiros was concerned that the emissions could contain particles of chemical waste.

EPA Response: Testing and pilot scale studies will be done prior to full-scale operation on the incineration process to determine optimum operating parameters and to verify the ability of the process to remove principal organic hazardous constituents (POHCs) and particulates from emissions. Regulations under the Toxic Substances Control Act for PCB incineration require 99.9999% Destruction and Removal Efficiency (DRE), and under RCRA 99.99% for each POHC. System performance will be monitored throughout remediation to insure that emissions comply with all air quality standards. The incinerator will be shut down if noncompliance is discovered.

2. Comments Concerning Groundwater Contamination

Comment 1. FACE stated that they do not support the future use of the aquifer as a drinking water supply for the City of Woburn.

EPA Response: EPAs intention is to restore the aquifer to drinking water standards for a variety of reasons which are set forth in the ROD. If the City of Woburn or the local population does not wish the water to be used for a drinking water supply, that is their prerogative. EPA does not require a town or city to use a certain water supply.

Comment 2. FACE and Woburn Conservation Commission expressed concerns regarding effects of pumping and discharging groundwater. FACE expressed concern that pumping groundwater from six source areas to a central treatment plant would deplete the aquifer and lower the level of the river when treated water is reinjected into the aquifer south of the treatment plant. FACE suggested that reinjecting the treated water at each of the source areas would be more protective of water levels in the area. Woburn Conservation Commission expressed concerns about erosion that could occur at the Aberjona River if all water was discharged to the river.

EPA Response: The location of the treatment plant(s) does not affect the level of the water in the river or the aquifer. However, the location of the extraction wells, and the area of reinjection of water would. The selected remedy no longer requires a central treatment plant nor pumping of the central area. The discharge locations of each of the five separate source areas may vary. Treated groundwater will be reinjected into the aquifer, released to the Aberjona River, or both. The discharge locations will be determined during the design phase. The effects on the River and aquifer will be considered and minimized.

Comment 3. Citizen Medeiros asked whether there would be monitoring and backup systems to ensure that the water treatment facility discharges only clean water into the river.

EPA Response: Monitoring of effluent from the individual source area groundwater treatment plants will be required before reinjection or disposal to insure that the water quality meets ARARs. The point of discharge for the effluent will be defined during the design phase for each individual plant.

3. Comments Concerning Wetlands Issues

Comment 1. FACE and Citizen Medeiros expressed concern over the possibility of a pipeline carrying contaminated water leaking or breaking and spreading contaminants, particularly in the area under Olympia Avenue through conservation land and wetlands.

EPA Response: As stated in the ROD, EPA now requires separate treatment plants and therefore no piping through the wetlands to a central plant is required.

Comment 2. Woburn Conservation Commission expressed concern that all wetlands impacts associated with this project be minimized as much as possible, and that all performance standards found in 310 CMR 10.00 be adhered to.

EPA Response: EPA shares this concern and will minimize wetlands impacts as it proceeds with the central area study, and ultimately decides on the remedy for restoration of the central area aquifer.

Comment 3. Woburn Conservation Commission remarked that the central groundwater treatment facility should be located in an upland area, in an effort to preserve wetland resource areas.

EPA Response: Since EPA now requires separate treatment plants at each of the source areas, the placement of a central treatment facility is no longer relevant. Where wetlands may be an issue at the source areas, all treatment facilities will be located in upland areas to the extent possible.

4. Miscellaneous Comments

Comment 1. Congressman Markey expressed concern that EPA's Proposed Plan will not treat all contaminants posing a public health risk at the Wells G & H site, and that a more complete analysis should be provided. The Representative also remarked that the cleanup goals should be to remove all risk not just the majority of risk.

EPA Response: EPA's Endangerment Assessment (EA) evaluated the risk posed by all the contaminants found at the site. The chemicals that presented the greatest risk from different chemical classes and various media were selected as target compounds. Although there are contaminants that exist at the site that are not being removed, these contaminants do not present a health threat under both average and plausible maximum scenarios. It is technically not feasible to remove all risk from the site. EPA's selected remedy will remove the majority of the risk to reduce the risk to a minimal or nonsignificant level.

Comment 2. Woburn Conservation Commission remarked that before the site is removed from the National Priorities List, any separate operable units must be remediated.

EPA Response: Operable units are considered to be components of the larger site. Wells G & H will not be delisted until all operable units have been addressed.

Comment 3. Citizen Medeiros asked that the undeveloped land along Olympia Avenue not be sold to help defray cleanup costs, as was the case with the Industri-Plex site.

EPA Response: The Record of Decision (ROD) does not contemplate the sale of land to defray costs. EPA does plan to seek cleanup or payment from Potentially Responsible Parties (PRPs). However, EPA has no control over whether a PRP sells land to defray costs of cleanup.

B. Potentially Responsible Party (PRP) Comments

Comments received from the PRPs, and EPA's responses, are summarized and organized into the following categories:

1. Risk Evaluation
2. Soil Contamination
3. Groundwater Contamination
4. Engineering Issues
5. Legal Issues
6. Miscellaneous Comments

1. Comments Concerning Risk Evaluation

Comment 1. Beatrice - The Endangerment Assessment (EA) does not comply with EPA's Superfund Public Health Evaluation Manual. The EA relies on worst-case assumptions that create an inflated risk. The "representative concentration" used to find the "average case", assumes that a chemical was present even when analytical results from a laboratory state that it was not detected. The term "representative concentration" is arbitrary and misleading since it is not representative or the best estimate of concentrations as intended in the Manual.

EPA Response: The EA assesses the average case and plausible maximum case which is consistent with Superfund Public Health Evaluation Manual's (SPHEM's) best estimates and conservative upper bound estimates. It should be recognized that the EA does not present a "worst-case" analysis. The maximum plausible case has been a component of numerous Endangerment Assessments and is necessary to address potential exposure to discrete source areas. In laboratory analysis the precision and the accuracy of the analytical results must be taken into account. The non-detection of certain chemicals does not guarantee the absence of those chemicals. If chemicals are present below the detection limit but above the levels of concern, excluding these chemicals would underestimate the associated risk. Using the detection limit concentration for chemicals with "non-detection" is conservative and may be necessary in the best interest of public health protection. If, on the other hand, chemical concentrations are below both the detection limit and the levels of concern, their exclusion would not significantly impact the risk estimates.

Comment 2. Beatrice - The Endangerment Assessment (EA) gives no basis for assuming its frequencies of exposure. For example, it was assumed an individual would frequent the site 168 days per year for 6 years. No individual would waste their time trespassing for this length of time.

EPA Response: EPA makes assumptions considered to be conservative and yet reasonable. Frequencies of exposure take into consideration unique site specific conditions. For example it is known that the site had been frequented in the past by young adults with bikes. With reference to the example cited by the commenter, the individual was assumed to frequent the site 168 days/year for 6 years under plausible maximum conditions. As stated in the EA, although the site is currently fenced, it is possible that the fence could be cut and young adults with dirt bikes could ride on the unpaved road at the Wildwood property. Conservative assumptions are employed to limit uncertainty in risk assessment. In a site as complex as Wells G & H, there is a considerable amount of uncertainty generated by site factors, in addition to the normal uncertainty associated with health criteria and exposure parameters. Considering these factors, along with EPA's mandate to protect public health and the environment, any relaxation of the degree of conservatism of the assumptions could result in greater uncertainty and, ultimately, a diminished degree of health protection.

Comment 3. Beatrice - The Endangerment Assessment (EA) uses a 45% absorption factor in the percent PAHs, pesticides, PCBs and phthalates absorbed from ingested soils. A factor of 25% is more appropriate based on a study by Poiger and Schlatter on tetrachlorodibenzoparadioxin 2,3,7,8 TCDD (referred to as TCDD).

EPA Response: Much of the technical information which has been supplied by the commenter is erroneous and indicates bias in selectively citing studies. Investigators (e.g., McConnell, E.E., Science 223, 1077, 1984; Umbreit, T., et al, Science, 232, 497, 1986; Rumbaugh, R.C. et al, Toxicologist, 4:113, 1984) have found the bioavailability of TCDD to range upward to 85%, which is a value considerably higher than both that used in the EA and cited by the commenter. Poigner and Schlatter (1980, referenced in the Endangerment Assessment) presented a range of absorption from 19.3 to 28.9% for TCDD from an aqueous suspension. Gries and Marrow (J. Agri. Food Chem. 23.265, 1985) found that about 45% of TCDD was absorbed from food. In view of the considerable uncertainty as demonstrated by these values, EPA believes that 45% is a reasonable value to use.

Comment 4. Beatrice - The Endangerment Assessment (EA) uses 100% absorption factor for percent inorganic compounds absorbed from ingested soils. A value of 10% would be more reasonable as indicated by the Drinking Water Health Advisory.

EPA Response: The comments concerning oral ingestion of metals indicate a misinterpretation of the meaning and application of the relative absorption factor (RAF) by the commenter. RAF is not the measurement of actual absorption rate. It is the ratio of the actual absorption rate through the medium and the route of the study. It is used in the calculation of reference dose (RfD) for non-carcinogenic effects or cancer potency factor (CPF) for carcinogenic effects. For example, the EA does not assume 100% absorption of inorganic compounds from soil by ingestion. Rather, the EA assumes that the absorption of inorganics from soil by ingestion is the same as that from the study used to derive the RFD or CPF.

Comment 5. Beatrice - The Endangerment Assessment (EA) uses inappropriately high absorption values for the percent of organic compounds absorbed dermally from the skin. Absorption studies indicated that most chemicals were poorly absorbed after topical administration.

EPA Response: EPA believes the commenter has cited references in a selective manner. The commenter's evaluation would lead one to believe that dermal absorption of pesticides was poor. More recent work, however, shows that particular pesticides can be up to 90% absorbed through the skin (Shah, P.V. et al. Jour. Tox. Environ. Health, 21:353, 1987). In addition, certain aromatic hydrocarbons can be absorbed through the skin more readily than water (Brown et al., AJPH, May 1984, 74:479). EPA feels that the weight of evidence and the amount of uncertainty clearly supports the choice of assumptions used in the Endangerment Assessment. EPA also points out that, as noted above, literature exists which supports more extreme values than were used for many of the Endangerment Assessment exposure scenarios, further demonstrating that an overall worst case approach was not taken.

Comment 6. Beatrice - The Endangerment Assessment's (EA's) estimates of fugitive dust emissions are not correctly applied to the exposure model. Three of four variables exceed the requirements for valid situations for use of the equation as described in the Superfund Exposure Assessment Manual.

EPA Response: EPA disagrees with the analysis of the fugitive dust model presented by the commenter. The most recent version of the reference (EPA, 1985, Compilation of Air Pollution Emission Factors, 4th Ed., known as AP.42) makes no reference to "valid" situations. EPA very clearly states that the use of this model will generate a quality rating of "A" if used under the conditions which are called "valid situations" by the commenter. Reasonable extrapolation to other conditions will result in a quality rating of "B". Although a quality rating of "B" is adequate for use in a risk assessment, it will be associated with more uncertainty than a rating of "A"; therefore, EPA feels justified in using conservative assumptions in conjunction with this model.

Comment 7. UniFirst - Lead is a chemical of potential concern and has been poorly studied at the Wells G & H site. Its presence was detected in the groundwater. The Feasibility Study calculation of daily intake of lead does not include the fact that half of intake may come from food and beverage.

EPA Response: Lead was considered to be a chemical of potential concern at the Wells G & H site. The data base used in the Endangerment Assessment was selected to provide the most accurate representation of potential exposures to groundwater at the site. Lead was only detected once in the central area of the site in the subset of wells considered (S68, S83, S85, S86, S87, and S89). It is likely that data reported by UniFirst for lead detected in Well G and Well H were samples that were not filtered.

Action levels were determined for those chemicals to which exposure would result in a level which exceeded the reference dose for noncarcinogens. Exposure to lead at any of the source areas did not result in this level of exposure. Nonetheless, the soil action level for lead did consider lead in drinking water, although this was not explicitly referred to in the Feasibility Study (FS). The background level referred to all ambient exposures, not only air exposures as was stated in the text of the FS.

Comment 8. Beatrice - The proposed cleanup levels for contaminants in soil and groundwater at the 15 acre Wildwood property are excessively stringent. Beatrice states that EPA assumes that the aquifer should be remediated to drinking water standards. Beatrice states that MCLs are arbitrary because it is unlikely that anyone would operate a drinking water supply well on the 15 acres. Beatrice proposes to apply cleanup standards at the place where the discharge of groundwater will create a risk of exposure to wildlife (the Aberjona River) where the permissible groundwater quality standards can be set as Alternative Concentration Limits (ACLs) that take into account surface water dilution.

EPA Response: With respect to achieving drinking water standards in the aquifer, EPA states in 40 CFR Part 300, National Oil and Hazardous Substances Pollution Contingency Plan; Proposed Rule (Fed. Reg. 53:51394-51520, December 21, 1988) that "it has been the policy of EPA's Superfund program for several years to operate within the framework of EPA's Groundwater Protection Strategy in determining the appropriate remediation for contaminated groundwater at CERCLA sites." The groundwater at the Wells G & H site has been used as a drinking water source in the past and is classified as a Class II-B groundwater, one that may potentially be used as a drinking water source. EPA states further that, "for groundwater that is or may be used for drinking water (Class I or II), the maximum contaminant levels (MCLs) set under the Safe Drinking Water Act or more stringent promulgated State standards are generally applicable or relevant and appropriate standards" (ARARs). There are six limited circumstances where ARARs may be waived under CERCLA § 121(d)(4). These are:

> i) the remedial action selected is only part of a total remedial action that will attain such level or standard of control when completed;
>
> ii) compliance with such requirement at that facility will result in greater risk to human health and the environment than alternative options;
>
> iii) compliance with such requirements is technically impracticable from an engineering perspective;
>
> iv) the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach;
>
> v) with respect to a State standard, requirement, criteria, or limitation, the State has not consistently applied (or demonstrated the intention to consistently apply) the standard, requirement, criteria, or limitation in similar circumstances at other remedial actions within the State; or
>
> vi) in the case of a remedial action to be undertaken solely under section 104 using the Fund, selection of a remedial action that attains such level or standard of control will not provide a balance between the need for protection of public health and welfare and the environment at the facility under consideration, and the availability of amounts from the Fund to respond to other sites which present or may present a threat to public health or welfare or the environment, taking into consideration the relative immediacy of such threats.

None of these six conditions apply at the Wells G & H site. Thus, EPA is justified in setting action levels that will result in the attainment of drinking water standards in the aquifer throughout the site.

It should be noted that the cleanup standards for treated groundwater are distinct from the cleanup standards to be met in the aquifer. EPA identified Maximum Contaminant Levels (MCLs), under the Safe Drinking Water Act, as cleanup goals for the groundwater to be met in the aquifer. Cleanup standards for treated groundwater will depend upon the point of discharge which will be defined during design. If the effluent is discharged to the aquifer, MCLs would be appropriate. If the effluent is discharged to the Aberjona River, effluent targets will be the Massachusetts Ambient Water Quality Standards (AWQSs).

Comment 9. Beatrice - A proper Endangerment Assessment (EA) of the 15 acre Wildwood property shows minimal risk to human health and only modest risk to wildlife. Residential use of the property is unlikely as is the use of the aquifer as a drinking water supply. Due to this low potential for exposure, risks to human health are vanishingly small.

EPA Response: EA Table 1-1 shows "potential pathways of exposure to contaminants originating at the Wells G & H Site". It indicates that potential for human exposure is low or low to medium under the current condition. However, it also shows that the potential for human exposure to contaminated soil and groundwater is high in the future. In the remediation of Superfund sites, EPA must consider both the current and future exposure scenarios. See comment 10 for a discussion of the probability of future exposure scenarios.

Comment 10. W. R. Grace & Co. and New England Plastic (NEP) - Future use scenarios for the respective properties are not likely, probable or reasonable. The properties are not zoned for residences and it is unlikely that the property will ever be developed for residential purposes. NEP thus maintains there is no risk or future risk involving soil contamination at NEP. W.R. Grace & Co. further states there is no reasonable possibility that a well to supply drinking water will be installed at the Grace property. Grace thus maintains that no complete exposure pathways exist under either current or future use conditions.

EPA Response: EPA cannot control future potential uses of properties within a Superfund site. Considering that the site is a mixed zoning area containing residential (next to W.R. Grace & Co.), light industrial, and commercial areas, it is indeed possible that at some time in the future the properties could be used for residential purposes or for commercial purposes. Under such scenarios, exposure to adults and children may be greater than at present. The same argument applies to the installation of a private well. EPA must take into consideration present risk as well as any future risk to public health.

Comment 11. Beatrice - All risk from dermal contact from soil and sludge is less than EPA's acceptable range of 10^{-4} - 10^{-7}.

EPA Response: EPA's primary goal is to protect the public health to the extent feasible. Risk from dermal contact from soil and sludge are within the range of 10^{-4} to 10^{-7} considered for remediation. However, the point of departure is 10^{-6}.

2. Comments Concerning Soil Contamination

Comment 1. Beatrice - The cleanup levels for soils on the 15 acres are inconsistent with standards at other CERCLA sites in Region I. The Ottati & Goss Site in Kingston, New Hampshire used different soil levels for similar conditions.

EPA Response: Cleanup levels are developed under site specific consideration. Levels also reflect the best information and knowledge available at the time of the cleanup level development. While the methodology used for the cleanup level development should be the same or similar for each site, the ultimate cleanup level may vary from one site to another based on site-specific circumstances.

Comment 2. Olympia - The Proposed Plan does not specifically indicate the amount of soil to be removed from Juniper (Olympia) property. The levels of contaminants on the Juniper property do not warrant soil treatment.

EPA Response: The quantity of soil that will be removed on the Olympia property is written in the FS under the 10^{-6} risk range category (Appendix D Table D-5). It is based on cleanup levels established for contaminants which were found on the Olympia property in levels that present a risk to public health. EPA estimates that there is approximately 5 cubic yards of contaminated soil to be removed at the Olympia property. Soil sampling will be conducted during design in order to refine this estimate.

Comment 3. Beatrice - The manner in which contaminated soil volumes were calculated at the Wildwood property is inexact and inappropriate.

EPA Response: EPA acknowledges that the calculated volumes of contaminated soil at the Wildwood property anticipated to require remediation are not exact values. However, the method used to calculate soil volumes is considered appropriate for the Feasibility Study (FS) evaluation purposes for which it was intended. As identified in the ROD, soil sampling will take place during remedial design in order to refine the soil volumes presented in the FS.

At the Wildwood site, separate volume calculations were made for soil contaminated with VOCs and non-volatile organic contaminants. This was done since different remedial treatment technologies were developed for the two different types of contaminated soil. The VOC contaminated area was based on contamination detected in several borings, including borings #4, #7, #8, #11, #12, #13, #15, A3, A4, A5 and MW-13 (based on the results of the Part II RI and the Supplemental RI). The actual delineation line was based on field observations made during the Supplemental RI fieldwork and the J. J. Riley site activity map prepared by Weston Geophysical Corporation. The VOC area which was used in the volume calculation includes the area encompassing all of the VOC contaminated soil borings in close geographic proximity to each other, plus an area around isolated boring #15. Volume calculations assumed contamination to the four foot water table depth.

Mixed (volatile and non-volatile) contaminated soil volumes are based on contamination detected in borings #1, #5, #9, #10 and A16 from the Part II RI and the Supplemental RI (See Tables D-1 and D-5 of the FS Appendix D). The actual volume delineation line was again based on field observations during the Supplemental RI and the J. J. Riley site activity map. Borings #9, #10 and A16 are in the same area of the property. Boring #1 encompassed area underneath the debris pile. As is discussed in the FS, for VOC contaminated soil borings, the depth of contamination was either estimated from the sampling results where detailed contaminant concentration depth profiles existed, or assumed to be the depth to the water table (approximately 4 feet).

Finally, for subsurface VOC contamination at isolated borings such as boring #15, a 20 foot by 20 foot area of contamination was assumed. This was done in recognition of the fact that the VOC contaminants are relatively mobile and not readily attenuated by soils. Smaller contaminated soil volumes (10 feet by 10 feet) were assumed for surface soils which are predominantly contaminated with non-volatile and relatively non-mobile contaminants.

3. Comments Concerning Groundwater Contamination

Comment 1. W.R. Grace & Co. - The hydrogeological flow model and general approach is not appropriate for application in developing pump and treat alternatives.

EPA Response: The model used, the Prickett Lonnquist Aquifer Simulation Model, provided only two portions of the analysis of the pump and treat alternatives; (1) the minimum pumping rates required to capture the source plumes, and (2) groundwater contours for each of the four pump and treat alternatives. A second approach of removing one plume volume per year was also used to establish pumping rates. The recommended pumping rate was then selected as the larger of either the minimum rate or the rate required to remove one plume volume per year, and a crude estimate of bedrock pumping was added. The recommended pumping rate in the overburden aquifer was then used to produce the groundwater contours for each of the four pump and treat alternatives. Thus, the flow model was not actually used to evaluate the pump and treat alternatives.

In a more classical approach to evaluation of the alternatives, the flow model would have been used to determine groundwater velocities for input into a groundwater transport model. The transport model would have then been used to evaluate clean-up times where absorption/desorption of the contaminant was considered. Because the amount of organic carbon in the overburden aquifer was unknown, and there was little data to evaluate the influence of the bedrock, the classical approach was not followed and a more simplified approach was taken (i.e., the amount of data available did not warrant application of a more sophisticated approach).

The EPA used a simplified approach based on a relationship between the number of flush volumes and the organic carbon content of the overburden to estimate clean-up times. A realistic, yet conservative range of possible overburden organic carbon contents was assumed. This approach yields clean-up times that range from three to over 50 years. Had data on organic carbon content been available, a more exact clean-up time could have been obtained, and had data on the bedrock properties been available, more exact pumping rates could have been obtained. It is recognized that the refinement of clean-up times and pumping rates may alter the estimated costs of clean-up. However, it will not alter the decision that pump and treat is the best mode of remediation at the Wells G & H site. Refinement of pumping rates and clean-up times will be accomplished during the remedial design.

Comment 2. Beatrice - The treatment of the central aquifer area is technically insupportable. The aquifer will never meet drinking water standards due to high background levels of naturally occurring substances. It is arbitrary to impose the cost of treating the groundwater when it will never be potable without further treatment. The more reasonable approach would be to let the aquifer cleanse itself through natural processes in approximately 20 years.

EPA Response: EPA believes the commenter has misinterpreted the time necessary for the central area to clean itself under natural conditions (with only the Riley Well pumping). The cleanup time for the central area under natural conditions is estimated to be 200 to 1000 years (Feasibility Study Appendix C-27) rather than the 20 years stated by the commenter. At this time, the Riley Well has ceased pumping and the ROD no longer calls for immediate pumping of the central area. Since the Riley Well is no longer pumping, the time frame for the aquifer to cleanse itself under natural conditions would be longer than previously stated. See comment 12 in the Engineering Issues section of this Responsiveness Summary for discussion of remediation of naturally occurring substances in the groundwater.

A number of comments were received by the EPA regarding the central area. In light of these comments, EPA has decided to perform a focused study to more fully evaluate the concerns that were raised during the public comment period prior to making a decision on remediation of this area. The objectives of this study are discussed in the ROD.

Comment 3. UniFirst Corp. - The DNAPL problem in the UniFirst property groundwater must be resolved prior to overburden pumping or soil excavation.

EPA Response: EPA agrees that the DNAPL problem in the bedrock at the UniFirst property must be resolved prior to establishment of an effective pump and treat system for the contaminated groundwater in the overburden. The source of contamination, the undissolved DNAPL, must be removed or the overburden aquifer will be recontaminated from the bedrock. The DNAPL problem in the bedrock will be investigated further during design and the results will be used to obtain a better estimate of cleanup times as EPA has stated in the Feasibility Study Appendix C.

Comment 4. UniFirst Corp. - The assumed organic carbon values (less than 0.1-0.5%) used to estimate flushing times are much too large.

EPA Response: The assumed organic carbon values of 0.1% to 0.5% are within the range of values expected for deep unconsolidated river sediments. The sand and gravel deposits were reworked by the ancestral Aberjona River and the finer material (silts and clays) would be expected to have higher concentrations. As the deposition of glacial outwash along the river neared an end, the amount of organic carbon in the upper deposits would also be expected to be higher because they were deposited over a longer time period. As the deposition outwash sediments ended, marshes formed, which deposited a layer of peat along the river (i.e., very high organic carbon). As noted by the commenter (Cherry, etal, 1989; pp 26) maximum thicknesses of the peat layer have been demonstrated to reach up to 26 feet deep. Meandering of the Aberjona River over the last few thousand years has reworked the upper layer of outwash and peat so that the peat layer is discontinuous. This reworking has likely mixed organic carbon from the peat layer and other near surface soils into the upper layers of the outwash deposits. The mode of deposition of the sediments in the central area has formed a complex system of sediments in which the organic carbon would be expected to range from fractions of a percent to nearly 100 percent.

For these reasons EPA believes that assumption of organic carbon contents lower than 0.1% would result in very optimistic flushing times for removal of volatile organic contaminants. Also, because of the history of these deposits, sampling to arrive at a realistic average value for organic carbon would require the collection of numerous cores to sample the braided deposits which are expected to vary in organic carbon in both vertical and lateral directions.

Finally, it should also be recognized that the flushing time calculation estimates presented in Appendix C of the Feasibility Study, while conservative, are far from being too large, as is shown with respect to certain calculation assumptions. For example, these calculations were based on trichloroethene (TCE) since it is the most widespread volatile halogenated organic groundwater contaminant at the Wells G & H site. However, in certain areas, including the UniFirst property and in central site areas abutting this property, groundwater tetrachloroethene (PCE) concentrations are significantly greater than TCE concentrations. It is well known that PCE possesses a significantly higher organic carbon normalized partition coefficient (Koc) value (364; EPA, 1986)than does TCE (126; EPA, 1986). This implies that PCE is likely to be significantly more difficult to flush out of the aquifer system than TCE and will require longer flushing times. Based on the calculations in Appendix C of the Feasibility Study, PCE might require up to three times as long as TCE to achieve a similar concentration reduction.

In view of this, EPA again believes that the assumption of optimal flushing conditions, including low sediment total organic carbon values would result in overly optimistic predictions of times required for groundwater volatile organic removal.

Comment 5. UniFirst Corp. - Due to the hydraulic connection between the Aberjona River and the aquifer, pumping the central area will result in the introduction of non-VOC contaminants present in the surface water and watershed into the central area. These include coliform, PAHs, and heavy metals. An introduction of these contaminants will further complicate the remedial attempts and be counter productive to the achievement of stated groundwater goals for the central area.

EPA Response: EPA believes that a more detailed investigation of the central area is warranted before a decision on remediation of that area can be made. As stated in the ROD, a study of the central area will address issues such as the interaction of the Aberjona River and the aquifer, and the impacts of pumping the central area.

Comment 6. UniFirst Corp. - Due to the hydraulic connection between the Aberjona River and the aquifer, pumping the central area will result in the introduction of microorganisms and viruses into the central area.

EPA Response: It is possible that, as the commenter contends, viruses and microorganisms may migrate from the Aberjona River to the central area. As stated in the previous response, the selected remedy no longer calls for pumping of the central area at this time. The hydraulic connection between the Aberjona River and the aquifer will be further evaluated. It should be noted, however, that if this water were to be used as a municipal water supply, it would most likely be required to be filtered prior to distribution.

Comment 7. UniFirst Corp. - The level of radionuclides detected in the groundwater at the Wells G & H site poses a potential hazard with respect to water usage.

EPA Response: From the available data, it is uncertain as to whether the source of the elevated levels at well S22 is anthropogenic or naturally occurring. Given the fact that elevated naturally occurring bedrock formations can act as a source of radionuclides in groundwater, the latter explanation is quite possible. Assuming the radionuclide source is naturally occurring and localized, it may have little site wide impact. This would be further evaluated during remedial design. However, given the close proximity of well S22 to the UniFirst and W. R. Grace Properties, extraction of water from the bedrock could be of potentially greater concern and may impact groundwater treatment at these locations. More detailed evaluation of potential risks from radionuclides would be conducted as part of further evaluations of potential aquifer usage.

Five wells (S72S, S81S, S77S, S84S,and S22) were sampled for radionuclides. Four of the wells, those designated with an S after the well number, were screened in the overburden. Well S22 was screened in the bedrock aquifer. With the exception of levels in Well S22, all the radionuclide concentrations were below the Maximum Concentration Limits (MCLs).

The water samples used in the Endangerment Assessment were unfiltered water samples. Well S22 was resampled by EPA and the radionuclides were found to be present, primarily in the particulate phase. If the aquifer were used for drinking water purposes, the water would be expected to undergo filtration prior to distribution, thereby reducing the concentrations of the radionuclides to meet drinking water standards. Similarly, because the only well to contain relatively high concentrations of radionuclides was a bedrock well, significantly removed from Wells G & H, it is quite possible that the overburden soils could act as a natural filter if water were pumped from the central area.

Background concentrations of radionuclides for the Woburn area are not available. The concentrations detected at the Wells G & H site can, however, be compared to nationwide concentrations. Radium-226,228 concentrations in municipal water supplies ranged from 0.1 pCi/liter to 25 pCi/liter (EPA, Notice of Proposed Rulemaking Dealing With Radionuclides under the Safe Drinking Water Act. Fed. Reg. 51.34836, Sept. 30, 1986). The radium-226,228 geometric mean and maximum concentrations range from 0.2 pCi/liter to 6.7 pCi/liter. The geometric mean concentration of uranium is 2.4 pCi/liter and the maximum concentration is 4 pCi/liter at Wells G & H. These concentrations fall within the range of national concentrations.

The range of gross alpha particles detected in national samples is less than 15 pCi/liter to 40 pCi/liter, which is within this range. The maximum concentration of gross alpha particles is 350 pCi/liter which is outside this range. National average concentrations were not presented for gross beta particles in the Federal Register notice.

Comment 8. W. R. Grace & Co. - The central area used in the groundwater modeling represents neither the zone of influence nor the zone of contribution.

EPA Response: The EPA agrees with W. R. Grace that the central area represents neither the zone of influence nor the zone of contribution to Wells G & H. It represents portions of both the zone of influence and the zone of contribution. The central area approximates more or less the portion of the site remaining after the source plumes are removed. For that reason it was defined as "the elliptical region most influenced by Wells G & H" (Feasibility Study Appendix C, page c-1).

Comment 9. W. R. Grace & Co. - The hydrogeological flow model was so flawed, it could not be used for evaluation purposes of pump and treat alternatives.

EPA Response: As previously indicated in Comment 1 of this section, a groundwater flow model was used to aid in evaluation of the pump and treat alternatives. The model was used to provide two products. First, the model was used to help calculate the theoretical minimum pumping requirements (based on a criterion that the pumping rate must be large enough to ensure that there was no further expansion of the contaminated groundwater plumes); second, the model was used to enhance understanding of the flow pattern for each pump and treat alternative. These two results from the flow model were then combined with calculations of the number of flush volumes necessary to remove contamination to develop cleanup time estimates for each source plume area and the central area. The combined flow modeling and cleanup time analysis indicates that cleanup times may require up to 50 years and that pumping is recommended at each source plume area and the central area to ensure that there is no further spread of contamination.

In general, the flow model used parallels developed by the USGS, and was calibrated based on the USGS 30-day pumping test. The model uses hydraulic conductivity data developed by USGS and these data were modified where necessary to yield better results. The Aberjona River and the aquifer-river interaction was incorporated into the model using 28 constant head river nodes. The model was found to be representative of site data over short durations, and should not be expected to be accurate for long duration model runs because recharge was not incorporated into it. Because the model was only used to develop minimum pumping rates (to which a safety factor of 3 was applied to account for uncertainties), and to determine groundwater contours for each alternative (both of which could be done in a short duration model run), the EPA believes that it is adequate for this purpose.

As was indicated in the Feasibility Study (FS), it is recognized that the flow model developed for the Wells G & H site has uncertainties and should not be expected to be completely and precisely representative of the hydrogeologic system. The weaknesses of the model were pointed out explicitly in Appendix C of the FS report. For example, the first paragraph of Appendix C states: "Therefore, the modeling and calculations discussed in this appendix are not a basis for design of pump and treat systems." Comments focusing mainly on model uncertainty and accuracy fail to recognize the intended purpose of the model.

As discussed and indicated in Appendix C of the FS, a relatively conservative safety factor was applied to model results wherever necessary. It is acknowledged that with a more accurate and representative model, more precise and possibly shorter cleanup time frames may result. However, EPA feels that any increased accuracy in flow modeling to support the FS evaluations would be completely outweighed by uncertainties in the effects of bedrock aquifer contamination, contaminant sediment-water interactions in the overburden, and the presence of DNAPL.

Responses to specific comments on the model are provided below:

Response to Comments on the Area to be Modeled

The model locations shown in Figure C-2 of Feasibility Study Appendix C represent exactly where the simulation properties are defined. The modeling area was not misrepresented in any of the simulations. This figure, showing the model grid, was not intended to delineate the simulation boundary.

Response to Comments on the Model Boundary Conditions

Due to an oversight, an inconsistency was not corrected in the final version of Appendix C. The correct version of the text on page C-5 of Appendix C (first paragraph) is provided as follows:

Instead of "Constant head boundary conditions were imposed in the top two layers at the north, east, and west boundaries with the piezometric head ranging from 50 feet to 95 feet", it should read "Constant head boundary conditions were imposed in the top two layers at the west boundaries with the piezometric head ranging from 50 feet to 95 feet".

In addition, the constant head boundary condition was correctly set by using a recharge factor of 10E12. Although the User's manual for PLASM specifies the use of a large number for this factor, it does not mean that you have to use 10E21. For the computer which was used (IBM Personal System/2), using an input of 10E12 has the effect of simulating constant head boundary conditions. In a model test it would not make any difference whether 10E12 or 10E21 is used. The west boundary will always maintain a constant piezometric level.

The uncertainty associated with the model boundary conditions is recognized. The boundary conditions set forth in the model were based on a USGS study (draft USGS report) with certain modifications. If the commenter has more reliable information regarding boundary conditions, and how incorporating such information into the model would alter the results of analyses of the pump and treat alternatives, EPA is receptive to such changes and improvement.

Response to Comments on the Use of the "Calibrated" Model for Actual Simulation

The "calibrated" model was correctly used to evaluate pump and treat alternatives. Using a set of obsolete data (for the "calibrated" model), the commenter has mistakenly pointed out that EPA's consultant "had altered the model during the simulation". The boundary nodes and their recharge rates shown in the commenter's obsolete calibration data (Geotrans, 1989; Figures 4-3 and 4-4) should be replaced by all the boundary nodes and their recharge rates shown in Figure 4-5.

Response to Comments on Model Accuracy

In the data files, the ERROR criteria was deliberately set to 3 feet which is much tighter than necessary so that the maximum number of iterations (in this case, 50 times) would be guaranteed in each numerical calculation. This allowed evaluation of the maximum ERROR generated by the simulation.

Using the commenter's example (Geotrans, 1989; Table 4-2), the maximum error resulting from 50 iterations is 8.4 feet. This ERROR value is considered to be acceptable for the purposes for which the model was used.

Response to Comments on Model Calibration

Two errors related to model calibration were included in the discussion in Appendix C of the FS in the first paragraph on page C-6. First, on line 2, instead of "3-day Pumping Test", it should be "30-day Pumping Test". Second, on line 3, instead of "steady state conditions", it should be "conditions where wells G&H are not pumping".

It should be recognized that a steady state hydrogeological flow condition would not be established in the Wells G & H site due to dynamic hydrologic changes. A steady state simulation was not attempted because recharge was not incorporated into the model. During the processes of model calibration, two simulations were performed: one with Wells G & H pumping, and the other without Wells G & H pumping. Both simulations are under the transient conditions (not steady state conditions), and also both simulations have one well pumping (the Riley Well is pumping even under the non-G&H pumping condition); nevertheless, the input data file for the G&H pumping simulation was named GH1PMP with the connotation of "Pumping" and for the non-G&H pumping simulation GH1SS, for convenience. The terms "Pumping (PMP)" and "Steady State (SS)" were "in-house" terms used, to distinguish the two transient simulations.

Response to Comments on Aquifer Hydraulic Properties

The hydraulic properties at the nodes that represent Wells G & H were imposed in order to yield a model calibration against the USGS 30-day pumping test. It is recognized that these values are not representative of the values derived from the test, which are used for the area surrounding the wells. The aquifer response data during the pumping test are best simulated using these values, and the values could represent deterioration of the wells prior to the test being conducted.

The higher value of hydraulic conductivity at the Riley Well is an artifact of prior model runs where the Riley Well was thought to have been pumping at 650 gpm. This higher value was necessary to simulate the unrealistically high pumping rate. When the actual pumping rate at the Riley Well was found to be 270 gpm the higher hydraulic conductivity at the well was not reduced accordingly. This oversight should not affect the groundwater contours in the vicinity of the Riley Well.

Response to Comment on Simulation Time Frames

At the time that the Work Plan for the FS was written, long term groundwater flow modeling was expected to be done, and there was a possibility that groundwater transport modeling would also be conducted. As work at the site progressed, it became apparent that the data available did not warrant the application of detailed flow and transport modeling. Data on the distribution of organic carbon in the overburden aquifer and on the relationship between the bedrock and the overburden aquifer were inadequate for application of a more sophisticated approach.

The model used was intended only to simulate pumping rates and groundwater contours from short duration model runs (less than 30 days). The model is limited for long term calculations because recharge is not incorporated into it. The EPA agrees that longer term more detailed modeling may be required for the design phase at the Wells G & H site. This modeling should incorporate the bedrock aquifer. Also, a more regional approach may be required to obtain a better understanding of the boundary conditions for site modeling of groundwater flow and contaminant transport.

Response to Comments on Recharge and River Interaction

The model which was used does not incorporate recharge from rainfall. For this reason the model cannot be used to simulate long periods of time. It is recognized that over longer periods of time, rainfall infiltration would have to be added to the model. However, the small error introduced by not incorporating recharge is outweighed by the uncertainty factor of 3 applied to the minimum pumping rates. In addition, the groundwater contours are insensitive to recharge over the short simulation time periods.

The river recharge/discharge was incorporated into the model using 28 constant head river nodes. Failure to recognize the existence of this feature in the modeling may have stimulated a number of comments on the poor agreement of the model with field conditions.

Response to Comments on the Ability of the Model to Evaluate the W. R. Grace Site

The minimum pumping rate for the W. R. Grace source plume was calculated as the flow through a cross section of the source plume. The fact that the model does not incorporate all of the source plume will not affect flow through this cross section. The simulated minimum value of 9.6 gpm was then multiplied by a factor of 3 to account for uncertainties in the model. This gave a minimum pumping rate of 30 gpm. A second approach of pumping one plume volume per year gave a value of 45 gpm. This number was based on the entire plume area, a thickness of 80 feet, and a porosity of 0.25 percent. The higher value of 45 gpm was then used in the flow model to produce groundwater contours in the vicinity of the source plume. For this simulation the pumping was assumed to take place in only one location near the downgradient tip of the source plume which is well within the modeled area.

Pre-design work including source specific pump tests will be required to refine pumping rates. In addition, more detailed modeling may be required in order to: (1) incorporate the effects of the fractured bedrock, (2) determine the placement of pumping wells, and (3) incorporate site specific features at each source plume area. Modeling would consider only one source plume area at a time (i.e., the W. R. Grace site) in order to more accurately incorporate site specific features (e.g., a thinner, tighter overburden). It is recognized that the value of pumping at each source plume area could change somewhat during the design phase. However, the EPA considers the values used to be adequate for the Feasibility Study analyses of the potential costs of each alternative.

The reversal of gradients discussed by the commenter may have resulted from not incorporating the river/aquifer interaction into the model. As they stated earlier these interactions are extremely important to defining aquifer behavior.

Comment 10. UniFirst Corp. and Beatrice - Pumping the central area aquifer at Wells G & H will dry-up the wetlands.

EPA Response: As stated in the ROD, the selected remedy no longer calls for pumping of the central area at this time. The potential effects of pumping the central area will be evaluated further during conduct of the central area study.

Comment 11. UniFirst Corp. - Pumping rates at the UniFirst property are not correct especially for the overburden.

EPA Response: Values of hydraulic conductivity for the overburden aquifer were taken from the USGS pumping test which was conducted at Wells G & H. The hydraulic conductivity from the test is not likely very representative of glacial deposits farther from the river. Pumping rates at UniFirst will be defined during the design phase and will be based on the results of predesign pump tests and investigations.

Comment 12. New England Plastics (NEP) - NEP property should not be part of the site. USGS pump test failed to establish that NEP is within the zone of contribution of Wells G & H. Groundwater in the overburden aquifer flows from NEP to the southwest and any contaminant plumes are likely to reach the Aberjona River watershed, if at all, downgradient from the site (Wells G & H).

EPA Response: Clearly, under existing conditions, with only the Riley Well pumping, groundwater in the vicinity of the New England Plastics site flows southward toward the Aberjona River and Salem Street. However, as shown by the USGS pumping test and EPA modeling, some of the groundwater at New England Plastics is within the zone of contribution of Wells G & H when they are pumping (Feasibility Study, Appendix C). The shape of the contaminant plume (100 ppb total volatile organics) at New England Plastics is elongate in the direction of Well G which indicates the past influence of pumping of this well on the plume.

Comment 13. New England Plastics (NEP) - EPA studies to date have not adequately considered bedrock groundwater contamination and its significance. The overburden and bedrock aquifers behave differently and should be studied further by EPA.

EPA Response: The EPA study of the Wells G & H site focused largely on contamination in the overburden aquifer. The data available from these two interconnected aquifer systems indicates that much of the migration at each plume area has occurred in the overburden aquifer. The migration in the underlying fractured bedrock is expected to be slower. This slower migration has both positive and negative aspects; the positive aspect is that the spread of contamination is slower while the negative aspect is that the fractured bedrock will be much more difficult to remediate.

As presented in the ROD, the EPA recognizes the outstanding issues associated with the bedrock. Additional study of the bedrock aquifer will occur both during the predesign phase of the remedy, and during further investigation of the central area.

Comment 14. New England Plastics (NEP) - The extent of bedrock groundwater contamination in upgradient areas of the Wells G & H site has not been adequately considered. Any contamination on NEP property in the deep bedrock can be traced to upgradient sources. The direction of groundwater flow indicates the existence of a bedrock recharge area under the UniFirst and W.R. Grace properties. This documents how VOCs found in W.R. Grace's bedrock and under UniFirst property are migrating into NEP's bedrock.

EPA Response: The EPA, as NEP stated, did not address volatile organics in the fractured bedrock in recharge areas such as UniFirst. As stated in the response to the previous question, the EPA will more thoroughly address the bedrock contamination during the design phase through additional field investigations and more detailed groundwater modeling. Based on existing data, it appears that vertical migration of contaminants into the bedrock has occurred at plume areas which are in recharge areas. However, there is little evidence of significant lateral migration of contaminants in the bedrock aquifer.

Comment 15. New England Plastics - The pump and treat system in the central area may adversely affect contaminant plumes in the source areas.

EPA Response: It is recognized that pump and treat operations should not be initiated in the central area prior to initiation in the source areas. The reason for this is that pumping in the central area will tend to increase the downward gradient in areas further from the river such as Unifirst and W. R. Grace. This increased gradient could cause contaminants in these areas to migrate deeper into the bedrock. However, the data that exists on bedrock contamination indicates that there has been much more lateral spread of contaminants in the overburden than in the bedrock. As already stated, the central area pump and treat system is not a part of this remedy. The effects of pumping the central area will be further investigated as part of the central area study.

Comment 16. Olympia - EPA did not specify where groundwater extraction would occur within the Olympia property.

EPA Response: The exact locations of extraction wells will be determined in the design phase. However, it will most likely be in the vicinity of the area where substantial groundwater contamination with TCE was located.

Comment 17. Cummings Properties Management, Inc. (CPMI) - CPMI objects to the pathway of the proposed pipeline of contaminated water to the central treatment plant.

EPA Response: The ROD no longer calls for a central treatment plant therefore there will be no pipes connecting the 5 source areas or through the CPMI properties.

Comment 18. W.R. Grace - Whitney Barrel and Aberjona Auto Parts should be included in the study area as they are within the zone of contribution to the Riley Well and contaminated groundwater exists beneath these properties.

EPA Response: Based on the USGS Pump Test and RI activities, EPA concluded that Whitney Barrel and Aberjona Auto Parts were not within the zone of contribution to Wells G & H and thus were not included in the site. Whitney Barrel property is presently undergoing remedial investigation under supervision of the Massachusetts Department of Environmental Protection (DEP). Aberjona Auto Parts is currently recognized by the DEP as property to be investigated.

Comment 19. UniFirst - EPA did not consider Massachusetts drinking water regulations that relate to protection of drinking water supplies as applicable or relevant and appropriate requirements (ARARs). The groundwater and aquifers supplying the watershed cannot be adequately protected under Massachusetts drinking water regulations.

EPA Response: As previously stated, EPA's intention is to clean the aquifer to drinking water standards in order to be protective of human health and environment. Authority to distribute and utilize certain water supplies is given to the state and local level and compliance with Massachusetts drinking water regulations must be met before the aquifer will be used for drinking purposes.

Comment 20. New England Plastic (NEP) - The amounts of VOC's in the overburden groundwater on NEP property are de minimis.

EPA Response: The overburden and bedrock groundwater on NEP property contain contaminants in concentrations warranting remediation and therefore will be pumped and treated. The exact volumes and rates will be defined during the design stage. Approximate pumping rates can be found in the ROD Section X.

4. Comments Concerning Engineering Issues

Comment 1. W. R. Grace & Co. and UniFirst Corp. - The Feasibility Study (FS) is biased toward a central groundwater treatment facility concept employing air stripping. The FS fails to adequately consider the engineering advantages of individualized treatment.

EPA Response: The FS was not biased toward a central treatment facility concept. In the FS an extensive screening of potential groundwater treatment alternatives was undertaken in a manner consistent with the Agency guidelines as stated in Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. (Draft March, 1988; Interim Final October, 1988). In response to public comments concerning the central area treatment plant, EPA has opted for five separate treatment plants instead of a central facility, and is deferring decision on remediating the central area until completion of further study of the central area. EPA agrees that there are individualized treatment and pretreatment alternatives such as carbon adsorption and UV/chemical oxidation which could be appropriate for specific source areas. EPA also agrees, as stated in the FS, that certain cost reductions such as those achieved through reduction in pretreatment usage are appropriate.

EPA recognized that given the complexity of the Wells G & H site, many additional groundwater treatment alternatives could have been formulated. These include a multitude of alternatives involving various combinations of site specific technologies and treatment trains, such as those proposed by several commenters. In addition, there could exist a variety of alternatives involving intermediate treatment facility combinations involving treatment plant sharing and partial combining of waste streams. It was, however, well beyond the scope of the FS to systematically evaluate all of these alternatives in detail. Focus was, therefore, placed on detailed evaluation of those alternatives offering the most fundamental differences in the conceptual approaches to remediating the site while simultaneously holding the greatest promise of successfully addressing FS screening guidance criteria.

Following initial screening of potentially appropriate groundwater treatment technologies, a total of 19 Management of Migration (MOM) alternatives (in addition to 11 soil remediation alternatives) were identified for further screening on the basis of effectiveness, implementability and cost. These MOM alternatives were summarized in FS Table 3-5 which is attached.

As indicated in Table 3-5, these MOM alternatives fell into one of the following five major treatment approach categories:

- o MOM-1 No Action
- o MOM-2 Pump and Treat at Source Areas
- o MOM-3 Pump and Treat at Central Area
- o MOM-4 Pump and Treat at Source Areas and Central Area
- o MOM-5 Pump and Treat at Southern Boundary Areas

These categories were deliberately selected to differ widely in the extent of groundwater volatile organic remediation to be conducted, the technologies to be used, and in the geographical locations within the overall site area from which groundwater would be extracted. As indicated in Table 3-5, alternatives within each of the five principal categories include consideration of three different volatile organic treatment technologies (air stripping, carbon adsorption and UV/chemical oxidation). The MOM alternatives considered these technologies in conjunction with both separate treatment facilities and a combined central treatment facility.

It should be noted that the three treatment technologies which were considered (air stripping, carbon adsorption, and UV/chemical oxidation) are, in fact, the same technologies which have been argued by UniFirst as appropriate for volatile organic cleanup at the other four source areas.

The 19 MOM alternatives were subjected to an alternative screening consistent with Agency guidelines including those contained in Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites (USEPA, 1986). As previously indicated, screening factors included effectiveness, implementability, cost, and potential cleanup time frames. Based on this screening, MOM-5 alternatives involving treatment at the southern boundary of the site were not recommended for further consideration in view of the potentially lengthy remediation times required, as calculated in Appendix C of the FS. In addition, MOM-2 and MOM-4 treatment alternatives utilizing activated carbon were not recommended for detailed evaluation due to concerns that the technology would not be the potentially most appropriate or effective to apply to the more highly contaminated site groundwater, including those at the Wildwood property. Due to this factor and the potentially high groundwater flows to be treated in alternatives using central treatment facilities, air stripping was considered to be a more appropriate technology. In addition, from a cost perspective screening evaluations indicated carbon adsorption to be slightly more expensive than air stripping. Therefore, on a site-wide basis carbon adsorption was not considered to offer distinct advantages over air stripping.

The purpose of the FS alternative screening process is to reduce as appropriate the number of alternatives being considered and to focus the detailed screening on those remedial alternatives considered most appropriate based on the nine FS evaluation criteria. Therefore, based on the reasons previously discussed, carbon adsorption alternatives were not carried forward for more detailed analysis.

A relatively large number of MOM alternatives (12) were carried forward into the detailed evaluation. Those alternatives which were retained for detailed evaluation included MOM-2 and MOM-4 alternatives involving both separate treatment at source areas as well as treatment at a central facility. In addition, alternatives involving air stripping or UV/chemical oxidation were retained for detailed consideration.

In the detailed evaluation of the remaining 12 alternatives, the FS does not specifically recommend any single alternative; nor are the remaining alternatives ranked. However, based upon the detailed screening, the following technical engineering conclusions were reached and identified:

- A single central treatment facility was likely to be more economical than a suite of five facilities at each source area and a sixth facility in the central area.
- Air stripping would be an appropriate treatment technology for the groundwater volatile organics at the site and would be more cost-effective than UV/chemical oxidation. In addition, air stripping is a more proven technology with respect to application at Superfund sites.

TABLE 3 - 5

LIST OF ALTERNATIVES FOR DETAILED ANALYSIS

Source Control Alternatives (SC)

SC-1	No Action (Source Control)
SC-3	Excavation/On-Site Incineration/Backfill On-Site
SC-4	Excavation/Off-Site Incineration/Backfill with Clean Off-Site Soil
SC-5	Excavation/On-Site High Temperature Enhanced Volatilization/Backfill On-Site
SC-7	Excavation/On-Site Supercritical Fluid Extraction/ Backfill On-Site
SC-8	Excavation/On-Site Enhanced Volatilization/On-Site Incineration/Backfill On-Site
SC-9	Excavation/On-Site Enhanced Volatilization/Off-Site Incineration/Backfill With Treated and Clean Off-Site Soil
SC-10	In Situ Volatilization/Excavation/On-Site Incineration/ Backfill On-Site
SC-11	In Situ Volatilization/Excavation/Off-Site Incineration/ Backfill With Clean Off-Site Soil

Management of Migration Alternatives (MOM)

MOM-1	No Action (Management of Migration)
MOM-2	Pump and Treat Source Areas
-2A(i)	Pretreatment and Air Stripping at Separate Treatment Plants
-2A(ii)	Pretreatment and Air Stripping at a Central Treatment Plant
-2B(i)	Pretreatment and UV/Chemical oxidation at Separate Treatment Plants
-2B(ii)	Pretreatment and UV/Chemical oxidation at a Central Treatment Plant
MOM-3	Pump and Treat Central Area
-3A	Pretreatment and Air Stripping at Central Treatment Plant

TABLE 3-5 (Cont'd)

LIST OF ALTERNATIVES FOR DETAILED ANALYSIS

-3B	Pretreatment and UV/Chemical Oxidation at a Central Treatment Plant
-3C	Pretreatment and Carbon Adsorption at a Central Treatment Plant
MOM-4	Pump and Treat Source Areas and Central Area
-4A(i)	Pretreatment and Air Stripping at Separate Treatment Plants
-4A(ii)	Pretreatment and Air Stripping at a Central Treatment Plant
-4B(i)	Pretreatment and UV/Chemical Oxidation at Separate Treatment Plants
-4B(ii)	Pretreatment and UV/Chemical Oxidation at a Central Treatment Plant

Comment 2. W. R. Grace & Co. and UniFirst Corp. - The Feasibility Study (FS) includes unnecessary pretreatment prior to required groundwater treatment. This inclusion overstates separate source area treatment costs.

EPA Response: It was stated in the FS that pretreatment prior to air stripping may not be required at all properties and that this issue would be further evaluated during the remedial design. During evaluations of pretreatment technologies, vendors strongly recommended that pretreatment for iron be included in air stripping treatment designs at all locations where groundwater iron concentrations approached or exceeded 1 ppm. High groundwater iron concentrations will reduce air stripper efficiency through iron precipitation and possible air stripper plugging. Iron precipitation may also present potential problems to other treatment technologies. For UV/chemical oxidation systems, iron precipitation can increase water turbidity and reduce system efficiency. For carbon adsorption systems, iron precipitation can reduce efficiency and increase the need for backwashing.

Detailed site specific dissolved iron concentration data for each of the source areas is somewhat limited. Available data indicate that groundwater dissolved iron concentrations are quite variable throughout the site area. Concentrations exceeding 1.0 ppm have been detected in samples from the Olympia, Wildwood and central areas (NUS, 1986; Ebasco, 1988). Lower levels have been generally reported for the UniFirst and W. R. Grace site areas. However, iron concentrations in excess of 1.0 ppm have been reported in central area sampling wells including well S81 in relatively close proximity to the UniFirst property (NUS, 1986).

Depending upon the final locations of site extraction wells developed during remedial design, water containing high iron concentrations could, therefore, be a concern in many areas of the site. In addition, FS guidance for cost evaluations recommend that estimates be in a +50% to -30% range to avoid significant underestimates of remediation costs. Therefore, a conservative posture was adopted in the FS and pretreatment was included at all sites for comparison of alternatives. However, a cost sensitivity comparison of MOM alternatives with and without pretreatment was included in the FS (Table 4-42) and is attached. The results of this analysis confirmed that the removal of pretreatment does, in fact, significantly reduce overall treatment costs.

The potential cost impacts of reductions in pretreatment have been further examined in refined cost calculations for the MOM-2 and MOM-4 treatment scenarios using assumptions in which pretreatment may be required in certain areas but not in others. In Table E-1, (see attached) costs are presented to include pretreatment prior to air stripping only at the Olympia, Wildwood and central areas of the site. Pretreatment has not been included at the W. R. Grace, UniFirst and New England Plastics sites. In conjunction with elimination of pretreatment processes at the latter three locations, labor requirements have been reduced, as indicated.

Finally, it should be recognized that in certain site areas, remedial design evaluations may determine the appropriateness of pretreatment for chemical constituents other than iron. For example, one commenter (UniFirst Corp., 1989) has indicated the possible appropriateness of pretreatment for lead at the Olympia property.

TABLE 4-42

COST OF MANAGEMENT OF MIGRATION ALTERNATIVES WITH AND WITHOUT PRETREATMENT

	Cost with Pretreatment (1988 Million Dollars)				Cost Without Pretreatment (1988 Million Dollars)			
Alternative	Capital	Annual O&M		Present Worth	Capital	Annual O&M		Present Worth
MOM-2A(i)	8.1	3.7 (1-30 yrs)		65.2	6.5	2.1 (1-30 yrs)		38.8
MOM-2A(ii)	4.6	1.5 (1-30 yrs)		27.4	3.5	0.7 (1-30 yrs)		14.3
MOM-2B(i)	10.3	5.1 (1-30 yrs)		89.1	7.6	2.7 (1-30 yrs)		49.1
MOM-2B(ii)	5.4	2.5 (1-30 yrs)		44.2	4.1	1.8 (1-30 yrs)		31.8
MOM-3A	3.1	1.4 (1.30 yrs)		24.2	1.2	0.6 (1-30 yrs)		10.4
MOM-3B	3.3	1.6 (1-30 yrs)		28.2	1.9	0.8 (1-30 yrs)		14.2
MOM-3C	2.8	1.6 (1-30 yrs)		26.9	1.6	0.7 (1-30 yrs)		12.4
MOM-4A(i)	11.4	5.1 (1-10 yrs)	3.7 (11-30 yrs)	79.1	7.9	2.7 (1-10 yrs)	2.1 (11-30 yrs)	39.6
MOM-4A(ii)	7.0	2.3 (1-10 yrs)	1.6 (11-30 yrs)	37.1	4.7	1.0 (1-10 yrs)	0.9 (11-30 yrs)	15.6
MOM-4B(i)	13.7	6.7 (1-10 yrs)	5.1 (11-30 yrs)	104.8	9.6	3.6 (1-10 yrs)	2.8 (11-30 yrs)	52.8
MOM-4B(ii)	8.5	3.8 (1-10 yrs)	2.9 (11-30 yrs)	60.2	5.8	2.6 (1-10 yrs)	1.9 (11-30 yrs)	37.2

Note: (1) Present worth analysis based on 5 percent discount rate.

(2) Present worth analysis for all alternatives except MOM-4A(i), MOM-4A(ii), MOM-4B(i) and MOM-4B(ii) based on 5 percent discount rate and 30 year period. In case of MOM-4A(i), MOM-4A(ii), MOM-4B(ii) the central area will be pumped for 10 years with the objective of achieving MCLs.

TABLE E-1

COST COMPARISON OF MIGRATION ALTERNATIVES

WITH AND WITHOUT PRETREATMENT[1]

AIR STRIPPING TECHNOLOGY

ALTERNATIVE	CAPITAL	ANNUAL O&M	PRESENTWORTH
MOM-2A(i) (5 separate plants)	7.1	1.8 (1-30 yr)	34.1
MOM-2A(ii) (1 central plant)	3.7	1.1 (1-30 yr)	20.0
MOM-4A(i) (6 separate plants)	10.1	2.8 (1-10 yr) 1.8 (1-10 yr)	45.0
MOM-4A(ii) (1 central plant)	6.1	1.8 (1-10 years) 1.2 (11-30 years)	29.2

NOTES:

(1) The present worth analysis is based on 5 percent discount rate. The central area would be pumped for 10 years with the objective of achieving MCLs and the source areas for 30 years. (Dollars in millions).

Pretreatment has been assumed for the Wildwood, Olympia and central areas but not for the W. R. Grace, Unifirst and New England Plastics areas.

The labor requirements for sites without pretreatment have been assumed to be one man per 8 hour shift, 365 days per year, ($30/hour). Where pretreatment is required two men per 8 hour shift, 365 days per year have been assumed.

Comment 3. UniFirst Corp. - Cost estimations for separate source area treatment facilities were overestimated. There are several cost estimation factors which may ultimately result in reduced estimated costs for individual source area treatment facilities. Issues which involve lowering costs for five separate treatment facilities and a sixth treatment facility for the central area are the following:

- increased equipment sharing,
- reduced labor estimations,
- reduced site preparation costs, and
- reduced sampling costs.

EPA Response: EPA agrees that there are cost estimation factors which may result in reduced costs for the individual source area treatment facilities. While sharing of equipment such as trailers between sites certainly is possible, EPA could not in the Feasibility Study (FS) evaluation process assume such cooperation among all parties potentially involved in cleanup. In addition, the cleanup time schedule for each property may be different, particularly in the case of several separate treatment plants. It was, therefore, assumed that similar numbers of trailers would be needed for each treatment plant to be constructed and operated.

EPA agrees that some reductions in the labor requirements for treatment plant operation presented in the FS may be feasible. Labor requirements for treatment plant operation will generally depend more on the amount of equipment to be operated and monitored than on the size of the equipment. In the FS it was assumed that more attention would be required to operate a treatment plant at a Superfund site than a conventional water treatment plant. This was due in part to health and safety concerns and potential problems associated with possible spills of contaminated groundwater at unattended facilities. Conventional water treatment plants usually have a 24 hour operator.

The extent to which the labor requirements in the FS may be reduced is dependent upon assumptions regarding several factors including the need for pretreatment, the extent of facility automation, and the extent of chemical analysis performed by treatment plant staff.

Labor requirements developed in the FS assumed extensive in-plant chemical analyses. However, for discussion purposes reduced labor requirements have been included in cost estimates prepared for the individualized site treatment technologies proposed by some commenters. (These are included in the next comment).

Based upon review, for FS evaluation purposes it appears feasible to reduce labor requirements to one staff member, eight hours per day, daily, for sites not requiring pretreatment and two staff members eight hours per day, daily, for sites requiring pretreatment. Given that the recommended process requires monitoring several operations, as well as considerable in-plant chemical monitoring and testing, two staff members is considered an appropriate assumption where pretreatment is used. Further evaluations of treatment plant labor requirements would be conducted during remedial design evaluations.

EPA acknowledges that some savings in site preparation costs may be effected at certain locations. However, within the FS it was not feasible to specify with certainty the exact locations of individual treatment facilities.

With respect to sampling, individual treatment facilities would have to conduct their own groundwater sampling to determine the effectiveness of their remediation efforts. Therefore, groundwater sampling was specified for each treatment plant.

It should be noted that while EPA recognizes that the cost estimates could be refined, the EPA believes that they were adequate for the comparative analysis of the FS.

Comment 4. UniFirst Corp. and W. R. Grace & Co. - Certain technologies should be retained for individual sites based on waste stream characteristics. Individualized treatment technology costs were overestimated in the Feasibility Study (FS).

EPA Response: EPA agrees that at certain source locations treatment technologies such as carbon adsorption or UV/chemical oxidation may be viable alternatives to air stripping for the removal of volatile organics. EPA has incorporated flexibility into the ROD in regard to the specific treatment technology to be employed at each source location.

From a cost perspective, EPA agrees that reductions can be made to reduce the expense of individualized treatment plants by using air stripping as in MOM 2A(i).

The approximate total present worth cost for the six separate facilities estimated in Table E-2 (within the +50% and -30% FS guidance) is $46.2 million. This compares with an estimated cost of $29.2 million for the single central air stripping treatment facility of MOM 4A(ii) presented in Table E-1 (see comment 2 in this section) using comparable labor requirement assumptions.

In Table E-2 it has been assumed that UV/chemical oxidation would be used at the W. R. Grace site, carbon adsorption at the

UniFirst, New England Plastics and Olympia sites, and air stripping at the Wildwood and central areas. It has also been assumed that pretreatment would not be required at the W. R. Grace, UniFirst, and New England Plastics sites. Other cost reductions claimed by certain commenters for individual source area treatment such as sharing of trailers and use of existing buildings have not been included. Evaluation of the feasibility of site specific factors at this level of detail is necessarily a remedial design function.

TABLE E-2

COST CALCULATION FOR SEPARATE SOURCE AREA AND CENTRAL AREA TREATMENT FACILITIES (MOM-4A1) EMPLOYING INDIVIDUALIZED TREATMENT FACILITIES

AREA	TREATMENT	PRETREATMENT	CAPITAL COST	ANNUAL O&M COST	PRESENT WORTH COST
W. R. Grace	UV/Chemical Oxidation	No	812,500	287,200 (1-30 yrs)	5,227,300 (1-30 yrs)
Unifirst	Carbon Adsorption	No	758,100	330,400 (1-30 yrs)	5,837,000 (1-30 yrs)
Wildwood	Air Stripping	Yes	2,625,300	802,200 (1-30 yrs)	14,956,700 (1-30 yrs)
N.E. Plastics	Carbon Adsorption	No	657,200	172,700 (1-30 yrs)	3,311,900 (1-30 yrs)
Olympia	Carbon Adsorption	Yes	897,500	353,300 (1-30 yrs)	6,328,400 (1-30 yrs)
	Subtotal		5,750,600	1,945,800	35,661,300
Central Area	Air Stripping	Yes	2,926,400	985,500 (1-10 yrs)	10,536,400 (1-10 yrs)
TOTAL PRESENT WORTH			8,677,000	2,931,300 (1-10 yrs) 1,945,800 (11-30 yrs)	46,197,700

NOTE: (1) Present worth analysis based on 5 percent discount rate.

(2) Labor costs for facilities without pretreatment are based on one man per 8-hour day, 365 days/yr.

Labor cost for facilities with pretreatment are based on two men per 8-hour day, 365 days/yr and $30/hr.

Comment 5. W. R. Grace & Co. - The Feasibility Study (FS) significantly overestimates costs required for separate source treatment of groundwater at this property.

EPA Response: EPA concurs that the costs associated with the implementation of a treatment system at the W. R. Grace site can be reduced over those used in the FS. The principal cost savings (if appropriate) would be through the elimination of pretreatment (and associated reductions in labor requirements) which was identified in the FS as a possible cost savings to be confirmed during the remedial design. Several other proposed cost savings have been identified in comments received and may be appropriate.

A detailed review of proposed cost savings at this site is included in Table E-3. For comparison purposes Tables 5-2 and 5-3 submitted to EPA from Canonie Environmental, for W.R. Grace & Co. (Geotrans, 1989) are also attached. However, as is indicated therein, many of the proposed savings require evaluating the site at a level of detail which is beyond the scope of the FS and would have to be performed during remedial design efforts.

TABLE E-3

COMMENTS ON W. R. GRACE COST ESTIMATES FOR SOURCE AREA COLLECTION AND TREATMENT CAPITAL COSTS

Site Preparation

EPA agrees that if the site is paved, site clearing will not be necessary. Therefore, site preparation costs would be essentially zero. (This would be a remedial design cost evaluation activity).

Support Facilities

EPA agrees that five trailers for support facilities may not be necessary. However, the $3,000 estimated by Canonie appears to be too low. By sharing trailers it may be possible to reduce the number to two trailers, i.e., $64,200. By using existing buildings additional savings may be realized. (This would be a remedial design cost evaluation activity).

Pumping (Excavation)

The suitability of existing recovery wells and protection requirements for pumping stations can only be determined in the design phase. Assuming that existing wells are suitable the $70,000 estimate seems reasonable. (This would be a remedial design cost evaluation activity).

Equalization Tank

The equalization time proposed by EPA is four hours versus Canonie's 30 minutes. EPA does not think 30 minutes is sufficient for equalization.

Chemical/Feed; Storage System; Chemical Coagulation/Flocculation/Clarification and Sludge Handling System; Filtration (dual media)

Pretreatment may or may not be required. The limited available information indicates that pretreatment may not be required at the Grace property.

Filtration (Fabric Filter)

If no pretreatment is required this may be suitable.

UV/Chemical Oxidation Unit

EPAs cost estimate is $118,000 versus the Canonie estimate of $110,000. There is no significant difference.

TABLE E-3 (Cont'd)

Vapor Phase Activated Carbon Absorber

The Vent-Sorb units proposed by Canonie are suitable if no pretreatment is required. These are disposable carbon units.

Treated Groundwater Discharge System

The Canonie estimate of $70,000 using PVC pipe seems reasonable versus EPA's $80,000 for carbon steel pipe. However, if breakage is a concern carbon steel would be more appropriate.

Control Building

The Canonie estimate of $100,000 is reasonable provided no pretreatment is required.

Construction Indirects

The $50,000 estimated by Canonie is reasonable if no pretreatment is required.

Utilities

The $25,000 estimate made by Canonie is appropriate provided existing service is available and suitable. (This would be a remedial design cost evaluation activity).

Treatability Study

The $15,000 estimate made by Canonie is only appropriate for a limited treatability study. EPA estimates $50,000 to conduct studies detailed enough to obtain sufficient remedial design information.

Contingency

EPA uses 21% versus Canonie's 10%. 10% may be appropriate for a detailed cost estimate but it is too low for an FS type cost estimate.

Engineering

EPA and Canonie agree on a 10% factor.

Legal & Administrative

Canonie's estimate has no provision for these factors. EPA provides 5% which is appropriate.

TABLE E-3 (Cont'd)

O&M COSTS

Monitors

Groundwater Sampling - EPA and Canonie agree.

Laboratory Analysis

EPA's estimate of $16,000 for groundwater analysis is to monitor the effectiveness of remediation while Canonie provides for treatment plant influent and effluent analysis $27,400. EPA assumed that these analyses will be done by operators on site to obtain quick results for treatment plant operation.

Report

Canonie agrees with EPA.

Power

Canonie agrees with EPA.

Equalization Tank

Power for one pump - EPA's $400 versus Canonie's $300. The difference is not significant.

Chemical Feed/Storage; Recarbonation System; Filtration System

These are pretreatment costs. Pretreatment requirement would have to be confirmed in the design phase.

Filtration System

Canonie's estimate of $25,700 is appropriate provided no pretreatment is required.

Oxidation Chamber

EPA's estimate is $59,100 versus Canonie's $53,600 - the difference is not significant.

Vapor Phase Activated Carbon Absorbers

Not required if no pretreatment is needed and UV/oxidation is used.

TABLE E-3 (Cont'd)

Carbon Make Up

Canonie's estimate is appropriate if no pretreatment is needed, and UV/oxidation is used. Vent-sorb units are disposable.

Sludge Off-Site Disposal

Not necessary if no pretreatment is required.

Labor

Canonie's estimate of one person at 45 hours/week is too low. EPA recommends a minimum of one person for eight hours per day and 56 hours a week assuming pretreatment is not required. (Note: At this level of effort additional non-labor costs such as off-site laboratory analyses could be required.)

Maintenance Cost

EPA and Canonie agree.

Contingency

EPA and Canonie agree.

TABLE 5-2

W.R. GRACE PROPOSED TREATMENT UNIT
UV/CHEMICAL OXIDATION
CAPITAL COSTS

Component	Description	FS Cost Estimate	General Comments	Grace Cost Estimate
Site Preparation	Site clearing of trees, bushes, and debris, and a 1,000 sy area of crushed stone for parking of equipment.	$ 14,000	No site preparation necessary. Area adjacent to Cryovac Facility is paved.	$ -0-
Support Facilities	Consist of four office trailers for the EPA/DE, Engineers, Health and Safety, Contractor, and one contractor equipment trailer.	156,000	Construction of on-site treatment unit could be completed in less than three months. Trailer rental (2).	3,000
Pumping (Extraction)	Installation of two, 6-inch-diameter wells, 20 ft. deep, and one 6-inch-diameter well, 100 ft. deep with pumps, pipeline, and building for pumping station.	111,000	No building necessary for pumping station. Two recovery wells are present on-site.	70,000
Equalization Tank	One 16,000-gallon in-ground carbon steel tank with a discharge pump.	37,000	Tank sized to handle four hours of flow is excessive; 2,000-gallon above-ground tank acceptable.	7,500
Chemical Feed/ Storage System	Includes a hydrated lime storage bin with a lime solution feed tank and pump. A polymer storage and feed tanks with a feed pump.	15,000	Pretreatment for removal of inorganics is not required to achieve required VOC removal efficiencies.	-0-
Chemical Coagulation/ Flocculation/Clarification and Sludge Handling System	A 15 ft. upflow solids-contact type clarifier complete with drive mechanism, mixers, flocculation and settling zone, and a sludge transfer pump.	76,000	Pretreatment for removal of inorganics is not required to achieve required VOC removal efficiencies.	-0-

TABLE 5-2
(Continued)

W.R. GRACE PROPOSED TREATMENT UNIT
UV/CHEMICAL OXIDATION
CAPITAL COSTS

Component	Description	FS Cost Estimate	General Comments	Grace Cost Estimate
Recarbonation System	A 700-gallon reinforced concrete with CO_2 diffuser. A bulk CO_2 storage tank and refrigeration unit.	34,000	Pretreatment for removal of inorganics is not required to achieve required VOC removal efficiencies.	$ -0-
Filtration	A 5-ft. diameter by 8-ft. deep dual media pressure filter with a backwash pump and automatic controls A 2,000-gallon filtered water collection tank.	43,000	Fabric filter after oxidation unit.	15,000
UV/Chemical Oxidation Unit	Oxidation chamber (stainless steel) with feed pump and piping. A chemical feed system with storage tank (100-gallon stainless steel) and metering pump.	118,000		110,000
Vapor Phase Activated Carbon Adsorber	One, 3-ft. diameter by 4-ft. high carbon adsorption regeneration with automatic controls and in-situ regeneration option.	150,000	Vent-Sorb units to be used for equalization tank, oxidation unit is pressurized.	-0-
Treated Ground Water Discharge System	800 lf of 3-inch-diameter carbon steel.	80,000	PVC pipe substituted for carbon steel pipe.	70,000
Control Building		186,000	25 ft. x 40 ft. building (Butler building). Possibility of using existing building.	100,000*

TABLE 5-2
(Continued)

W.R. GRACE PROPOSED TREATMENT UNIT
UV/CHEMICAL OXIDATION
CAPITAL COSTS

Component	Description	FS Cost Estimate	General Comments	Grace Cost Estimate
Construction Indirects		80,000	Controls and instrumentation,	50,000
Utilities		155,000	Using Grace's existing power service	25,000
Treatability Study		50,000		15,000
Total Direct Construction Costs		$1,305,000	Subtotal	$465,500
Contingency (21 Percent)		274,000	Contingency (10 Percent)	46,600
Engineering (10 Percent)		130,500	Engineering (10 Percent)	46,600
Legal & Administrative (5 Percent)		65,300		
TOTAL		$1,774,800	TOTAL	$558,700

TABLE 5-3

W.R. GRACE PROPOSED TREATMENT UNIT
UV/CHEMICAL OXIDATION
ANNUAL O&M COSTS

Cost Component	Basis of Estimate	FS Annual O&M Cost Estimate	Year	General Comments	Grace Cost Estimate
Monitoring					
Ground Water Sampling	2 persons @ $30/hr 40 hrs per year	$ 2,400	1-30		$ 2,400
Laboratory Analysis	20 water samples/yr @ $800/sample	16,000	1-30	Need to monitor treatment effluent biweekly, monthly influent samples; 26 biweekly effluent @ 300, 12 monthly influent @ 300	27,400
Report	1 person @ $60/hr 50 hrs/yr	3,000	1-30		3,000
Pumping (Extraction)					
Power	At $0.10/kW-hr Total 1.6 HP 29 kW-hr/day	1,100	1-30		1,100
Equalization Tank					
Power for 1 Pump	At $0.10/kW-hr Total 0.7 HP 12 kW-hr/day	400	1-30	0.5 hp @ $0.10/kW-hr.	300

TABLE 5-3
(Continued)

W.R. GRACE PROPOSED TREATMENT UNIT
UV/CHEMICAL OXIDATION
ANNUAL O&M COSTS

Cost Component	Basis of Estimate	FS Annual O&M Cost Estimate	Year	General Comments	Grace Cost Estimate
Chemical Feed/Storage System					
Lime Usage	23 T/yr @ $75/T	1,700	1-30	Not necessary.	-0-
Polymer Usage	1,138 lbs/yr @ $2/lb	2,300	1-30	Not necessary.	
Recarbonation System					
Power for 1 Pump	At $0.10/kW-hr Total 0.8 HP 14 kW-hr/day	500	1-30	Not necessary.	-0-
Carbon Dioxide Usage	28 T/yr @ $500/T	14,000	1-30	Not necessary.	
Filtration System					
Power for 1 Pump	At $0.10/kW-hr Total 0.8 HP 14 kW-hr/day	500	1-30	Filter fabric, 24 rolls @ $300/roll Disposal of 24 drums @ $750/drum.	25,700

TABLE 5-3
(Continued)

W.R. GRACE PROPOSED TREATMENT UNIT
UV/CHEMICAL OXIDATION
ANNUAL O&M COSTS

Cost Component	Basis of Estimate	FS Annual O&M Cost Estimate	Year	General Comments	Grace Cost Estimate
Chemical Feed System (Hydrogen Peroxide)					
Hydrogen Peroxide	9.5 lbs/day @ $0.75/lb	2,600	1-30		2,600
Hydrogen Peroxide Pump	@ $0.10 kW-hr Total 0.1 HP 2 kW-hr/day	100	1-30		100
Pump to Feed Oxidation Chamber	@ $0.10/kW-hr Total 0.8 HP 15 kW-hr/day	500	1-30		500
Oxidation Chamber	@ $0.10/kW-hr 1,620 Kw-hr/day	59,100	1-30	$0.10/kW-hr 1,440 Kw-Hr/day	52,600
Vapor Phase Activated Carbon Adsorbers					
Fuel Cost		4,000	1-30		-0-
Carbon Makeup	800 lbs/yr @ $0.75/lb	600	1-30	Vent-Sorb units to treat air stream from equalization tank.	10,000

TABLE 5-3
(Continued)

W.R. GRACE PROPOSED TREATMENT UNIT
UV/CHEMICAL OXIDATION
ANNUAL O&M COSTS

Cost Component	Basis of Estimate	FS Annual O&M Cost Estimate	Year	General Comments	Grace Cost Estimate
Sludge Off-Site Disposal	300 tons/yr @ $125/ton	37,500	1-30	Not necessary.	-0-
Labor	6 men @ $30/hr 8 hrs/day	525,600	1-30	One plant person @ 45 hrs/wk.	70,200
Maintenance Cost (Building and Equipment)	8 Percent of Capital Cost	142,200	1-30		44,700
Contingency	5 Percent of Annual O&M	30,500	1-30		12,100
TOTAL ANNUAL O&M COST		847,500	1-30		252,700

Note: All cost estimates rounded up to nearest hundred.

Comment 6. W. R. Grace & Co. - Vinyl chloride and vapor phase carbon are not compatible. Therefore, UV/chemical oxidation should be the best option for groundwater treatment at the W. R. Grace site.

EPA Response: EPA does not agree that vinyl chloride and vapor phase carbon are incompatible. However, it does agree that removal of vinyl chloride from the air stream by vapor phase activated carbon requires careful monitoring of the carbon unit. Relatively frequent regeneration of vapor phase activated carbon may also be required.

EPA concurs that UV/chemical oxidation may be appropriate for treatment at the W. R. Grace property. However, UV/oxidation has not been applied at a full scale level to treat contaminated groundwater at Superfund sites. In the absence of confirmatory data, air stripping followed by vapor phase carbon adsorption was considered to be the most proven and overall best technology option for the Wells G & H site.

Comment 7. W. R. Grace & Co. - Separate treatment plants are more appropriate than a central treatment plant for the following reasons:

(a) Pipelines carrying contamination across roads & wetlands & properties are undesirable.

(b) Pipes may break or leak.

(c) Difficult river crossings would be required.

(d) A monitoring system or double containment system to prevent/detect leakage would be required.

(e) Individual treatment plants are faster to implement.

EPA Response: As stated before, in response to public comment, EPA has decided to change the remedy to call for five separate treatment facilities instead of one central treatment plant.

Comment 8. UniFirst - The combining of waste streams to one central treatment facility is not cost effective because it dilutes highly contaminated waste streams and mixes unique contaminants of concern.

EPA Response: Although a central treatment facility may be more cost effective, EPA is now calling for five separate facilities in response to the many concerns that were raised during the public comment period. EPA agrees that separate facilities offer the advantage of treating unique contaminants on a site specific basis.

Comment 9. UniFirst Corp. - The Feasibility Study (FS) overestimates the appropriate groundwater extraction pumping rate for the overburden at this property and overestimates the size and cost of the treatment facility required.

EPA Response: The respective sizes of the treatment facilities for each source area at the site were based on the pumping rates presented in Appendix C of the FS. The uncertainties associated with these pumping rates are clearly acknowledged in Appendix C. As indicated therein, more refined pumping rates and treatment facility sizes would be developed during the remedial design, as appropriate. EPA acknowledges that a reduction in treatment facility size could reduce estimated costs. The impact of a possible reduction in treatment facility size at this property on cost would depend upon the type of treatment utilized. For air stripping, an assumed 20 gpm facility (if appropriate) would be anticipated to generate capital and O&M costs roughly similar to those developed for the New England Plastics property. Minor modifications relating to site preparation would be required. Use of these figures does not dramatically alter the calculations presented in Table E-1 (Comment 2 in this section).

Comment 10. UniFirst Corp. - Although several of the source areas contain levels of contamination which can be treated with aqueous phase activated carbon adsorption, such treatment is rejected due to "high concentrations of volatile organics in the contaminated groundwater".

EPA Response: EPA agrees that some source areas contain levels of contamination which can be treated with aqueous phase activated carbon adsorption. As stated in the ROD, EPA will consider proposals for implementation of alternative treatment technologies that can be demonstrated to be equally or more effective than air stripping. As stated in comment 1 in this section, detailed evaluations on a site specific basis were beyond the scope of the Feasibility Study.

Comment 11. UniFirst Corp. - The treatability study done on contaminated groundwater served only to confirm choices of treatment technologies selected prior to the commencement of the study. Only the combined waste stream was studied and no examination of the treatability of the individual source area waste streams was performed.

EPA Response: EPA disagrees that the treatability study was done "on the combined waste stream". The treatability study was done on contaminated groundwater samples from two distinct source areas, i.e., groundwater from the Wildwood and UniFirst areas. Wildwood and UniFirst groundwater samples were selected for the treatability study because Wildwood groundwater has trichloroethene (TCE) as the major contaminant whereas UniFirst groundwater has tetrachloroethene (PCE) as the principal contaminant. The other source areas have concentrations of one or the other or both of these constituents present at generally lower concentrations.

EPA does concur that, ideally, treatability studies should be conducted on individual waste streams and that additional treatability studies may be appropriate for each of the waste streams to be treated. Additional treatability studies will be conducted during the remedial design phase.

Comment 12. Beatrice - The use of MCLs for manganese and iron is wrong. They are naturally occurring groundwater contaminants and have always exceeded these standards. There is no engineering reason why manganese needs to be treated since it will not hinder the efficiency of air strippers. EPA violates CERCLA § 104(a)(3) which prohibits remedial action to address the release of a naturally occurring substance in its unaltered form, or altered solely through naturally occurring processes or phenomena, from a location where it is naturally found.

EPA Response: EPA agrees that iron and manganese are naturally occurring groundwater constituents. EPA also agrees that groundwater treated to remove volatile organics and subsequently discharged to the Aberjona River would not necessarily have to meet MCLs for iron and manganese. Such discharges would, however, have to substantively comply with NPDES discharge permit limitations.

The naturally occurring high concentrations of iron and manganese do not render the aquifer an undesirable drinking water source. Many sources of groundwater require treatment to remove naturally occurring substances so that they are potable and can be used for a public water supply. Iron and manganese (particularly iron) reductions are also required for effective volatile organic treatment plant operation. According to vendor information, iron concentrations as low as 1.0 mg/l would adversely affect air stripper packing and operation. Groundwater iron concentrations at the Wildwood site are relatively high. The average groundwater iron concentration at the Wildwood property is approximately 3.8 mg/l (filtered), which is well above the 1.0 mg/l level recommended by air stripping vendors. Therefore, pretreatment is recommended based on available data.

Comment 13. Beatrice - Samples taken from the Wildwood property for the treatability study were not representative. Samples for the treatability study were taken from monitoring wells, not pumping wells. The samples from wells BOW14 and BSSW6 were mixed in strange ratios.

EPA Response: EPA disagrees that samples taken from the Wildwood property for the treatability study were not representative. Wells BSSW6 and BOW14 were selected to extract groundwater from the contaminated plume area. The composite ratio was selected in order to mix the groundwater samples and achieve a composite VOC concentration representative of the entire plume at Wildwood. Production wells at Wildwood and the Riley Well are located away from the major contaminated plume. Pumping at these wells would have resulted in spreading of the contaminated plume. Extraction wells for use in remediation will have to be located to extract most efficiently the most highly contaminated segments of the plume and minimize any spread of the plume.

Comment 14. UniFirst Corp. and W. R. Grace & Co. - Pretreatment options such as green sand should be considered as an alternative pretreatment technology to chemical precipitation.

EPA Response: Although it is possible to remove iron and manganese on zeolite exchange media (such as green sand), this practice is usually restricted to individual water sources in which iron and manganese concentrations are low, generally less than 0.5 mg/l. This is due to the fact that accumulations of precipitates of these metals may cause the exchange medium to lose its exchange capacity.

Green sand filtration may be applicable at W. R. Grace and UniFirst properties, but does not appear to be appropriate for the Wildwood area. Due to the iron concentration limitation described above, chemical precipitation was considered in the Feasibility Study (FS) to be more appropriate for site wide application. However, ion exchange was retained as a possible polishing step, if necessary.

If, based on remedial design evaluations, green sand filtration is used as a pretreatment method it will have to be regenerated after the exchange capacity is exhausted. The disposal of regeneration chemicals would also have to be considered.

Finally, it is recognized that other pretreatment technologies could be considered for use at certain properties of the Wells G & H site. However, as discussed in Comment 1 in this section, a detailed evaluation of all pretreatment options considered on a property specific basis was beyond the scope of the FS. Various pretreatment options would be considered during remedial design as appropriate.

Comment 15. UniFirst Corp. - Pilot scale and full scale air stripping operations rarely achieve 99.9% removal for many volatile contaminants. Further, even if this level of removal efficiency was possible, it would not meet the proposed ARARs for some compounds. Applying 99.9% removal to the total average VOC concentration at Wildwood, TCE at Wildwood would not meet target levels. To meet ARARs at Wildwood, a polishing step of aqueous phase carbon after air stripping would be necessary.

EPA Response: It is technically feasible to design an air stripper to achieve greater than 99.9% removal efficiency. TCE is one of the most easily strippable volatile organic compounds. The air stripping column for the Wildwood property was conceptually sized with 30 ft packing compared to 15 ft of packing for the other properties. This was done due to the high VOC concentrations in groundwater at Wildwood property. If necessary, the air strippers at Wildwood could be staged to achieve required effluent concentration (i.e. two 15 ft packed columns in series)

The conceptual sizing of the air stripping columns was based, in part, on the treatability study results presented in Table 4-17 of Appendix D of the Supplemental RI (Ebasco, 1988). As noted therein, model calculations indicate that an air stripper column height of 28.4 feet should be appropriate to reduce aqueous phase TCE concentrations to 1.0 ppb.

Comment 16. Beatrice - Treatability tests have not been performed to evaluate incineration as a treatment technology for soils at the Wildwood property.

EPA Response: A treatability test for incineration of soil on the Wildwood property is not needed. Incineration is a proven technology for organic contaminated soil. However, there will be a test burn to optimize the treatment parameters such as retention time, operating temperature, etc. The levels of volatile metals (arsenic, lead, etc.) present in the soils at Wildwood are low and are not anticipated to present a problem with respect to atmospheric emissions.

Comment 17. Beatrice - The location of an incinerator on the Wildwood property is inappropriate due to wetlands and floodplain concerns.

EPA Response: A mobile incinerator unit would preferably be located outside of the floodplain. Analyses performed in the FS indicate that there should be sufficient space to operate a mobile incinerator at the Wildwood property outside of the floodplain.

Comment 18. W.R. Grace & Co. - It does not make sense to treat extracted groundwater to drinking water standards prior to discharge to the Aberjona River.

EPA Response: The requirements for surface water discharge are determined by a detailed assessment of Federal and State Applicable or Relevant and Appropriate Regulatory requirements (ARAR's). The stated discharge limitations must be adhered to unless variance is agreed to by both parties. This regulatory posture is mandated by the provisions of Superfund Amendments and Reauthorization Act (SARA) and the National Contingency Plan (NCP).

EPA agrees that treated groundwater discharged to the Aberjona River would not necessarily have to meet drinking water standards. Discharges would be required to comply with NPDES discharge permit limitations. However, drinking water standards must ultimately be met in the aquifer, and for any treated groundwater that was to be reinjected into the aquifer.

5. Comments Concerning Legal Issues

Comment 1. Olympia - Under SARA, the drinking water standards do not have to be restored "as quickly as possible" as a remedial action objective.

EPA Response: The ROD remedial action, in response to public comments, differs from the remedial action in the proposed plan. The selected remedial action will not remediate all site groundwater as quickly as the proposed remedy because of the additional study being done in the central area. Nonetheless, EPA is committed to prompt restoration of the groundwater to drinking water standards, in light of SARA's requirement in 42 U.S.C. § 9632(b), that the Site remedial action be protective of human health and environment.

Comment 2. Beatrice - EPA should consider the findings and conclusions reached in Anderson v. W.R. Grace & Co. which found that there was no evidence to find that contaminants from the 15 acres of property abutting the Aberjona River now owned by Wildwood Conservation Corporation contaminated Wells G & H.

EPA Response: EPA has considered extensive data regarding the contamination of Wells G & H including Remedial Action Master Plan for East Woburn, Area of Influence and Zone of Contribution to Superfund Site Wells G & H, Woburn, Massachusetts, Wells G & H Site, Remedial Investigation Report, Part I, Woburn, Massachusetts, Wells G & H Remedial Investigation, Part II, Final Supplemental Remedial Investigation for Feasibility Study, Wells G & H Site, and Final Supplemental Remedial Investigation for

Feasibility Study, Wells G & H Site, Woburn, Massachusetts. Based on these studies, EPA determined that the 15 acres is within the zone of contribution to Wells G & H.

Comment 3. New England Plastic (NEP) - EPA failed to provide a statement of the basis and purpose of the selected action as called for under CERCLA as amended by SARA. EPA's action violates 42 U.S.C. § 9613.

EPA Response: EPA states on pages 8-20 of the Proposed Plan its basis for the preferred remedy. The section "EPA Criteria for Evaluating Alternatives", pages 18-20 provides analysis of the evaluation of alternatives and the rationale for proposal of the preferred alternative.

Comment 4. New England Plastic (NEP) - EPA's preferred response action does not comply with SARA § 121(a) and (b) because it is not: (1) cost effective; (2) a permanent solution; and (3) protective of human health and the environment.

EPA Response: The preferred alternative, as proposed, was consistent with CERCLA, protective of human health and the environment, cost effective, and a permanent solution. The preferred alternative also met various other statutory requirements and response objectives considered. The preferred alternative was changed to the remedy selected in the ROD in response to public comment. See Sections X and XI in the ROD for a discussion of the selected remedy and the statutory determinations.

Comment 5. W.R. Grace & Co. - The primary purpose of the Proposed Plan is to provide immediate access to drinking water to a potential populace for reasons unrelated to the Superfund program. Such action would be arbitrary and capricious.

EPA Response: Immediate treatment of the central area is no longer part of the selected remedy. Nonetheless, remediation of the aquifer remains a valid objective pursuant to CERCLA and would not be deemed arbitrary and capricious. Under EPA Groundwater Classification System [EPA Groundwater Protection Strategy (GWPS)], the Aberjona River Aquifer is classified as Class II B. Class II B aquifers are potential drinking water sources and guidelines for protection are established by GWPS based on the aquifers characteristics of vulnerability, use, and value. See ROD Section V (B) for further discussion.

Comment 6. W.R. Grace & Co. and UniFirst - To the extent EPA has discussed or received comments from the MWRA or DEP regarding the water supply policy of the Commonwealth of Massachusetts in relation to its selection of the remedy, EPA is required to include such comments in the Administrative Record. The proposed remedy if selected would therefore be an arbitrary and capricious action by the agency.

EPA Response: Rationale for choosing the proposed remedial action is properly documented in the Proposed Plan and other administrative documents. The Administrative Record contains sufficient information upon which the proposal is based. Inclusion in the Administrative Record of all internal deliberative memoranda is not required under CERCLA.

6. Miscellaneous Comments

Comment 1. Olympia questioned why there had been no attempt by EPA to address the source of Weyerhauser contamination.

EPA Response: The contamination in the groundwater found at the Weyerhauser property is indicative of a gasoline spill which would not fall under the jurisdiction of CERCLA. The DEP is currently involved in addressing this issue.

Comment 2. Cummings Properties Management, Inc. (CPMI) requests that further information be provided to the public as to why the area in which the drums were found that sparked the original investigation, has not been included in the site. CPMI further requests that all other areas that have been found to be sources of contamination be included in the site.

EPA Response: EPA has used groundwater monitoring information as an indication of sources of contamination. In this case, EPA did not find any significant groundwater contamination nearby this property and therefore did not pursue it as a source of contamination to the aquifer.

Comment 3. CPMI specifically objects to EPA's characterization of the Wells G & H site as a single site. They suggest EPA should at least classify each of the five currently identified source areas as individual sites impacting the surrounding areas.

EPA Response: The site placed on the National Priorities List (NPL) consists of Wells G & H and includes all areas of contaminated groundwater that affect Wells G & H when the wells are pumping. EPA believes the NPL listing is appropriate to achieve the objectives of remediation of contaminated areas influencing Wells G & H. EPA does not plan to change the listing.

Comment 4. Massachusetts Rifle Association (MRA) objects to any intrusion onto MRA land imposed by the cleanup plan. MRA would be willing to negotiate on a cleanup plan and wishes that particular portions of MRA property be left undisturbed. They further stated that they would like to be compensated for any intrusion by any and all responsible parties.

EPA Response: Since the management of migration (MOM) portion of the remedy had been changed, the ROD no longer calls for pumping groundwater to one central treatment plant. While EPA will not enter property unnecessarily, proper implementation of the cleanup will require activity on properties in the site area. EPA access is authorized under Section 104 (e) of CERCLA. Finally, regarding the issue of compensation to MRA by responsible parties, EPA response would be inappropriate and would not be part of such discussions.

IV. REMAINING CONCERNS

During the public comment period, at the public informational meeting on February 9, 1989 and at the informal public hearing held in Woburn on February 27, 1989, local residents, officials, and PRPs raised issues that will be of concern as the site moves into the remedial design and implementation phase. These issues and concerns are summarized below, along with EPA comments on how the Agency intends to address these concerns.

Comment 1. FACE recommended that further studies be conducted to identify the extent to which heavy metals have contaminated sediments in the Aberjona River and suggested exploring the possibility that these contaminants have migrated along the Aberjona River from the Industri-Plex Superfund site.

EPA Response: As stated in the ROD Section IV, the Aberjona River will be addressed as part of another operable unit.

Comment 2. FACE suggested that EPA work with the City of Woburn to establish an Aquifer Protection District to restrict and prohibit the use of hazardous materials which could cause further contamination.

EPA Response: EPA has already promulgated extensive regulations in the handling of hazardous waste throughout the United States. The Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6901 et. et seq., establishes a system for handling hazardous waste which is designed to protect human health and the environment from such contaminants. Regulations promulgated pursuant to RCRA can be found at 40 C.F.R. Parts 260-271. Specifically, 40 C.F.R. 264, Subpart F establishes requirements for monitoring the groundwater to detect and respond to the presence of contaminants. As EPA believes the RCRA system is appropriate to protect against further contaminations in the Wells G & H area, EPA will not be establishing an aquifer protection district pursuant to this ROD. EPA remains willing however to work with the City of Woburn on matters related to Wells G & H.

Comment 3. Citizen McAveeney recommended that the following actions be considered to supplement remediation efforts: strict time parameters established; community representation for resolution; area business involvement; and a weekly status report provided to the public.

EPA Response: During design phase all citizens will be kept apprised of ongoing process through the usual methods of fact sheets and press releases. Meetings at FACE headquarters (or with any other group that invites EPA) can occur on as regular a basis as is agreed upon. Time parameters will be included in the consent decree or Administrative Orders.

Comment 4. Woburn Conservation Commission and Citizen Medeiros suggested that the maintenance, monitoring and prevention of vandalism to the treatment system needs to be addressed in the design phase.

EPA Response: EPA agrees with these issues and they will be addressed in the design process.

REFERENCES

Cherry, J., M.L. Johnson and R. J. Jaeger. Technical Report on the Woburn Massachusetts Wells G&H Site, March, 1989, Prepared for Unifirst Corp.

Ebasco Services Incorporated, 1988. Final Supplemental Remedial Investigation for Feasibility Study, Wells G&H Site, Woburn, Massachusetts. Prepared for Region I, U.S. Environmental Protection Agency, EPA Work Assignment Number: 132-I146, December 1988.

Geotrans Consultants Inc., 1989. Review Comments Regarding the U. S. Environmental Protection Agency January 1989 Draft Final Feasibility Study Report - Wells G&H Site, December, 1988. Prepared for W. R. Grace & Co.

ICF/Clement Associates, 1988. Final Endangerment Assessment for the Wells G&H Site, Woburn, Massachusetts. Prepared for Ebasco Services Incorporated, December, 1988.

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U. S. Environmental Protection Agency, 1988, Superfund Public Health Evaluation Manual. EPA Report #540/1-86/060. Washington, D.C.

U. S. Environmental Protection Agency, 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Office of Emergency and Remedial Response, Office of Solid Waste and Emergency Response, OSWER Directive 9335.3-01, Draft. March, 1988 Interim Final October, 1988.

U. S. Environmental Protection Agency, 1986. Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites, Office of Solid Waste and Emergency Response, OSWER Directive 9283.1-2, Revised Draft. 1988.

U. S. Geological Survey, 1986. Area of Influence and Zone of Contribution to Wells G&H, Woburn, Massachusetts, Draft Report, 1986.

ATTACHMENT A

COMMUNITY RELATIONS ACTIVITIES
CONDUCTED AT THE
WELLS G & H SITE
IN WOBURN, MASSACHUSETTS

ATTACHMENT A

COMMUNITY RELATIONS ACTIVITIES CONDUCTED AT THE WELLS G & H SITE IN WOBURN, MASSACHUSETTS

Community relations activities conducted to date for remedial activities at the Wells G & H Superfund site include:

- November 1984 - EPA issued a press release to announce the initiation of field work to determine the nature, source and extent of contamination at the Wells G & H site.
- November 1985 - EPA released a Community Relations Plan describing citizen concerns about the site, and presenting a program to address those concerns and to keep citizens informed about and involved in site activities.
- March, 1986 - EPA issued a fact sheet to inform the public of the Remedial Investigation (RI) being conducted to establish the source and extent of contamination at the Wells G & H site.
- October 30, 1986 - EPA issued a press release announcing the availability of the Wells G & H RI report.
- November, 1986 - EPA issued a fact sheet to present the results and conclusions of the RI report.
- November 13, 1986 - EPA held a public informational meeting to explain the results of the RI and to present preliminary results of the Endangerment Assessment (EA).
- October, 1987 - EPA issued a fact sheet to describe plans for completing the RI and for developing the cleanup options for the Feasibility Study (FS).
- May, 1988 - EPA issued a fact sheet to describe the steps in the FS process and the opportunities for public involvement in the selection of a cleanup plan for the site.
- May 2, 1988 - EPA issued a press release announcing that EPA would hold an informal meeting to discuss the purpose of the FS.
- May 12, 1988 - EPA held an informal meeting to present the purpose of the FS and to discuss the FS process.

- December, 1988 - EPA issued a fact sheet to summarize Supplemental RI activities and their results, and to explain the purpose and results of the EA.

- December 14, 1988 - EPA issued a press release announcing the availability of the EA, and the Supplemental RI which further characterizes soil and groundwater contamination at the site.

- February 1, 1989 - EPA issued a press release announcing the completion of the draft FS and Proposed Plan. The release stated that EPA would hold a public meeting on February 9 on the FS and Proposed Plan.

- February 9, 1989 - EPA held a public informational meeting to present the FS and Proposed Plan.

- February 10, 1989 - EPA initiated a 40-day public comment period on the FS and EPA's preferred alternative for the Wells G & H site.

- February 27, 1989 - EPA conducted an informal public hearing on the remedial alternatives evaluated in the FS.

- April 26, 1989 - EPA issued a press release announcing that EPA would test air in homes near the Wells G & H site in response to concerns that indoor air contamination could result from vapors from contaminated groundwater beneath homes.

- August 25, 1989 - EPA issued a press release to announce the findings of the indoor air study conducted in Woburn, MA. EPA found no health threat from indoor air at homes near the Wells G & H site.

ATTACHMENT B
TRANSCRIPT OF THE FEBRUARY 27, 1989 INFORMAL PUBLIC HEARING

UNITED STATES OF AMERICA

ENVIRONMENTAL PROTECTION AGENCY

In the Matter of:

PUBLIC HEARING ON STUDIES RE:

WELLS G AND H SUPERFUND SITE
WOBURN, MASSACHUSETTS

Monday
February 27, 1989

Woburn City Hall
10 Common Street
Woburn, Massachusetts

The above-entitled matter came on for hearing, pursuant to Notice, at 7:45 o'clock p.m.

BEFORE:

RICHARD CAVAGNERO
Chief
Superfund Section
Environmental Protection Agency

BARBARA NEWMAN
Site Manager
Environmental Protection Agency

PROCEEDINGS

[7:45 p.m.]

MR. CAVAGNERO: My name is Richard Cavagnero and I am the Chief of the Superfund Section of EPA. With me, on my right, is Barbara Newman who is the Site Manager for the Wells G and H site.

The purpose of this hearing tonight is to formally accept oral comments, or written if you so desire, on a number of studies EPA has done at the Wells G and H site, including the remedial investigation report, dangerment assessment, feasibility study and the proposed plan for the remediation of the site.

I would first like to describe the format of the hearing tonight. Barbara will give you a brief overview of the proposed plan, five to ten minutes to refresh your memory. As many of you know, I guess, we were out here on February 9th for an informational meeting, at which Barbara and her contractors gave you a detailed presentation of the proposed plan. And, again, she will recap that before we take oral comments.

Following Barbara's overview, we will accept any oral comments you wish to make for the record. Those of you wishing to comment should have

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already filled out these little index cards. If you haven't already, please fill one out and give them to Diane Ready with the red sweater in the back.

If you don't have a copy, there are extra copies of the proposed plan on the table, as you enter the door.

And, I will be calling on people wishing to make statements in the order in which they filled out the form. Presently, we have three people, so I don't think we will have to put a time limit on their comments.

After all the comments have been heard, we will close the formal hearing. And, again, the purpose of the hearing is for EPA to receive any comments so that we can take them into consideration when we make our final decision on the remedy.

In the proposed plan, on page 2, is an address if you want to submit written comments in addition to or instead of your oral comments. We definitely want to receive them. They need to be in, postmarked no later than March 21st, which is the close of the comment period.

All the oral comments we receive tonight, and any written comments which we receive prior to March 21st, will be responded to when we come out wit

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a decision on the cleanup for the site in a document called _The Record of Decision_. Part of this document will include something called _The Responsiveness Summary_, wherein EPA will respond in writing to all comments which were received, both in writing and orally.

Are there any comments or questions on the format of the hearing?

[No response from audience]

MR. CAVAGNERO: Okay.

Well, with that, I guess we will start the formal hearing. We have three commentors. The first one is the Honorable John Rabbitt, Mayor of Woburn.

And I would ask you to come up to this mic so that the transcriber can get it down clearly.

MR. RABBITT: Thank you, Barbara.

In terms of the overall objectives of the Administration -- I have to speak for my administration, I can't speak for future administrations -- we do agree and we appreciate the fact that the EPA is coming up with a proposal to clean up the aquifer.

There have been a lot of misunderstandings with respect to my position with respect to my position of the aquifer and what we have done and what we have

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not done.

First of all, I would like to make it clear for the record that the wells in the aquifer, the G and H wells, are still intact. Is there any disagreement with that, that the wells are there?

MS. NEWMAN: Based on what you say.

MR. RABBITT: Okay, thank you.

The wells are there, the pipes are in the ground, we never touch the wells.

Number two is, we do agree. The City of Woburn, the Administration, would like to see the aquifer cleaned up.

However, I think where we have a very, very basic disagreement is the fact that, personally, and as long as I'm the Chief Administrator of the city, I will never support reopening those wells, based on the history of the aquifer itself, and based on the total uncertainty of what has happened to some of the children in the area.

I would also like to, for statement purposes, make the fact that it has been said that the City of Woburn has closed down those wells because of the fact that-- we don't want them reopened because of the fact that it's a cheap -- we are using cheap water now from the MDC. Well, anyone who knows the economics

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of water realizes that MDC water is not cheap. We definitely expend less money producing our own water then we would if we purchased the water -- as we purchase water from MDC.

At this particular time, we purchase probably about twenty five, twenty six percent of our water from MDC, and the rest of it is produced on our own wells.

But, I do appreciate an opportunity to speak in front of you. We do appreciate your coming in and proceeding to clean up the aquifer; however, based on the history of the field, this -- meaning myself -- will never support the reopening of the wells.

Thank you, very much.

MS. NEWMAN: Excuse me. I just want to ask you a question for clarification.

MR. RABBITT: Sure.

MS. NEWMAN: When you say never support the reopening of the wells, is that for drinking water purposes or for any other use; for remedial purposes or just in general?

MR. RABBITT: Oh, no. For testing purposes, for cleaning up, oh, certainly, we would support a -- I'm really talking about drinking water or water for human consumption. And I don't think you

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could convince anyone in the City of Woburn that this aquifer will ever be cleaned to a point -- you know, I have a lot of concerns, such as the peat is still in the ground, will the peat ever be clean? Will the peat ever, you know, will that still give off carcinogenics?

You know, just a lot of things that, if the aquifer is so contaminated, I think you are talking about twenty to fifty years of cleanup. I'm not going to be around fifty years -- possibly be around twenty years -- but, even in twenty years, I don't think I would drink any water or I would support anyone drinking any water from that aquifer.

Thank you.

MS. NEWMAN: Thank you.

MR. CAVAGNERO: Thank you.

Next, we have John Marlowe, Chairperson of FACE, For A Clean Environment.

MR. MARLOWE: I have a prepared statement here.

Before I get into that, the best indication of the time element between 1979 and 1989, where we are coming to the end of the road, is that I didn't need glasses ten years ago.

FACE is a grassroot environmental organization which was formed in 1979 when Wells G and

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H were closed because of volatile organic contamination. When the EPA identified the Industriplex site as one of the largest hazardous waste sites in the country, and when the original cluster of childhood leukemia was identified in Woburn, FACE began a ten year ordeal of monitoring the investigation and cleanup process.

Through the years, we have worked closely with EPA and DEQE to encourage the investigation and cleanup of the hazardous waste sites. We have also worked with the Mass. Department of Public Health, the US Centers for Disease Control, and Harvard University on investigations of the high rate of childhood and adult leukemia in Woburn.

We have enjoyed a close working relationship with the EPA. Although we have not always been in agreement, and we have frequently become impatient with the slowness of the Superfund process, we have found that the lines of communication have been open and the EPA has been responsive to our concerns.

We are in the process of applying for a Technical Assistance Grant, under the provisions of Superfund, which will provide us with the advice of technical experts in the review of design plans for the remediation of the Wells G and H site. We look forward

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to continuing the productive and open working relationship with the EPA which we have had in the past.

The following are comments specific to the Feasibility Study for the cleanup of the Wells G and H.

Future water supply potential: We certainly applaud the EPA's recommendation to restore the aquifer to drinking water quality. However, we do not, and can not, support the use of the aquifer as a drinking water supply for the City of Woburn.

While we recognize that the technology exists to remove contaminants from water, we believe that it is only possible to treat contaminants which can be identified through currently available testing procedures.

L.

The cause of the high rate of leukemia in Woburn has not been established. Until we have adequate explanation for the cause of the leukemia and proof that the groundwater in the Wells G and H area is not the cause, we can not support the use of this water as a drinking water supply.

Area wide ground and surface water investigation: Recent EPA studies have identified high levels of heavy metals such as arsenic, lead, and mercury in the sediments in the Aberjona River near the

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wells. The Feasibility Study does not make recommendations for the treatment of contaminated sediments.

We recommend that further studies be conducted to identify the extent of heavy metal contamination in the area. Since the identified metals are among those found on the Industriplex site to the north, further studies should explore the possibility that they have migrated along the Aberjona River from the Industriplex site.

L-

Plans for treatment of contaminated groundwater: We have a number of concerns about the construction of a central treatment plant to remove volatile organics from the groundwater. Pumping contaminated groundwater from the five source areas and from Wells G and H, and transporting it through a series of pipes to a central treatment plant will cause extensive destruction to wetlands in an area where contamination and development have already endangered natural conditions.

Further, we are concerned that pumping groundwater from six source areas to a central treatment plant will deplete the aquifer and lower the level of the river when treated water is reinjected into the aquifer south of the treatment plant. We

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suggest that pumping and treating groundwater in the six source areas and reinjecting it on each site would be more protective of water levels in the area and would further serve to flush contamination from bedrock.

Emissions from the incineration of contaminated soils: We realize that it would not be cost effective to remove contaminated soils from the site and incinerate or dispose of them offsite. However, we are concerned that emissions from onsite incineration of PCBs and pesticides could endanger residents in nearby neighborhoods and workers in adjacent industrial areas if the incineration process should fail at any time.

Institutional controls: The Feasibility Study makes no mention of the use of institutional controls to protect the study area from further degradation. We suggest that the EPA work with the City of Woburn to establish an Aquifer Protection District to restrict and prohibit the use of hazardous materials which could further contaminate Wells G and H.

I thank you, as the Chairperson of FACE, for having the opportunity to speak, and certainly as a lifelong resident of fifty years of the City of Woburn,

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this has probably been the most difficult time of any administration, whether it be Mayor Rabbitt's or all the previous ones, regarding this issue.

It's been said that all of us have watched Woburn splashed on national televisions for many different reasons on this specific issue. The EPA, in many cases, has done their best. From a personal point of view, I think more could have been done earlier, a ten year span is much too long.

And I would suggest to those in control of the EPA to use this as a model and let all the mistakes be made here so that in the future, you can see what was done, some sort of a capsulization should be done of all the difficult problems we have had here, why it took ten years to get to the point we are today, so that future members and future people that sit in the position you are in now will be able to determine and shortcut any potential procedure problems.

Thank you.

MR. CAVAGNERO: Thank you.

Herbert Meyer, from the Mystic River Watershed Association.

MR. MEYER: I appreciate the opportunity to make some comments.

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I have a suggestion that the Superfund Section of Remedial Projects, which Ms. Newman chairs, uses her Community Relation staff to make it the eyes and ears of her remedial projects. It notices that the residents and the administration of the City which is affected is doing and not doing. So, the Community Relations staff would regularly report to her if the city or town was not familiar with the Superfund program can remain in touch with her regularly.

Then, a point about the cheap and pure Quabbin water which Woburn, like many other cities or towns, are using. This is based on an obsolete Massachusetts law which forbids that towns and cities which are at a ten mile distance from the State House are not permitted to use their own water, but have to buy and recieve water of, now, Water Resource associated water.

And we would suggest that the city contact the state senators and representatives in the House to replace that obsolete law by a law which is in accord with the present thinking about using groundwater as long as it is good.

The Superfund remedial project section is committed to clean up the aquifer. Therefore, we feel that it would be pointless for the City of Woburn to

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not want to use the Wells G and H ever, if not for drinking water, they can certainly be used for other purposes.

The Woburn Aquifer is magnificent and should be restored to its original good quality. According to a 1982 map of the United States Geological Service, the aquifer, both in North Woburn and East Woburn, and the rest of the aquifer in Woburn have the potential for over twenty eight million gallons a day, which is a substantial percentage of the total groundwater within the metropolitan Boston area.

Therefore, since we are running short of water and will be unable to cover our water consumption by the year 2020, it would be in the interest of saving money for an increased production of groundwater by using the Connecticut River, or by other means, much longer. And, therefore, it would save the state -- who is already in financial trouble -- the necessity to increase the treatment of, for instance, the Connecticut River water for our purposes.

Thank you.

MR. CAVAGNERO: I have to apologize for a little lapse here. I was going to have Barbara go over the proposed plan first, before we took the comments, and for some reason I went right to the comments. So,

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we are going to have Barb now recap the proposed plan, for five or ten minutes, after which we will take additional comments if you have any or close the hearing.

MS. NEWMAN: Okay.

Hopefully, this recap will inspire some more comments.

For those of you who weren't at the meeting on February 9th, I'm just going to give you a brief overview of what the proposed plan was. There are two parts to it; a groundwater component and a soil component.

For the groundwater component, EPA recommends extracting groundwater from five source areas at the Well G and H site. These source areas are properties belonging to W. R. Grace and Company, Unifirst Corporation, Olympia Nominee Trust, Wildwood Corporation and New England Plastics. And, also extracting water from the center of the aquifer, which is the area in between these companys and around Wells G and H, and pumping that water all to one centrally located treatment plant in the center of the site, and treating the water.

First, pretreating it to remove the high iron and manganese levels in the water, which can

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sometimes foul up further treatment processes, and then air stripping it, which is a technology that blows air through the water and removes the volatile organic contaminants from the water and moves them into the air. The clean waters, then, can be discharged back into the aquifer and into the river.

And then the volatile organic contaminants are in the air. They are then sent through a carbon filter which absorbs these contaminants onto the filter, and then the filter is cleaned every so often and the contaminants are virtually destroyed at the end.

The objective is to reach drinking water standards for most of the contaminants, the volatile contaminants that are in the water. This would-- We predict that this will be done within ten years for the central area, as long as the source areas are continued to be pumped. And we predict that-- But pumping the source areas, it could take anywhere from twenty to fifty years to get those areas themselves, because their levels are much higher than the center area, down to drinking water standards.

For soil, we recommend -- there are two different technologies, a combination of two technologies. On the Wildwood Conservation Corporation

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property, there is an area of just volatile contamination in the soil that is kind of discrete and can be separated.

And for this, we propose using an in situ vacuum extraction technology, which basically is a -- it's a technology where you install wells into the ground and suck out the air from the soil. And the air that's contaminated with the volatiles is then vacuumed through a carbon filter which also absorbs these contaminants. It does not require excavation of the area. Some parts of the Wildwood Conservation Corporation property have wetlands and some of those wetlands are contaminated in the soil. So, this would not require excavation of the area.

And then the second component is incineration. We propose bringing a mobile incinerator on the site, excavating contaminated soil from several of the properties that are contaminated, bringing it into the incinerator and then replacing the clean soil back outside.

That should take approximately fifteen months once we are out there at the site. That does not include the time for bidding, for contractors and designing the implementation.

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The total cost for the remedy comes to approximately forty million three hundred thousand dollars, with it costing thirty seven million one hundred thousand dollars for the groundwater remedy and three million two hundred thousand dollars for the soil remedy.

MR. CAVAGNERO: Thank you, Barbara.

We will take any --

MS. NEWMAN: Did you say somebody was writing a comment, though, on a card?

Do you want to read this?

MR. CAVAGNERO: Sure.

MS. NEWMAN: This is for the record, too.

MR. CAVAGNERO: Paul A. Medeiros, Marietta Street, Woburn, Mass.

"I would like to be assured that the undeveloped land along Olympia Ave. is not sold to help defray cleanup costs, as was the case with the Industriplex site."

MS. NEWMAN: The undeveloped land along Olympia Avenue? Along the railroad track?

SPEAKER: Across from Unifirst.

MS. NEWMAN: Across from Unifirst. It belongs to the rifle range, that land? Does that belong to the rifle range, property?

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MR. RABBITT: The rifle range, I don't think they acquired the -- are they one of the properties involved in there?

MR. CAVAGNERO: Okay.

We have the Reverend Bruce A. Young.

REVEREND YOUNG: It wasn't my intention to speak tonight, and I speak as a resident and not as a member of any organization.

I am compelled to speak, however, by some of the things that have been mentioned already, what the Mayor has said and what Dr. Meyer has said and what Jack Marlowe said. And I want to add my comments to speak in opposition to the suggestion that the Aberjona aquifer ever be used for productive purposes to put the water back on line for drinking water purposes.

I think what's happened is -- Jack alluded the fact this goes back to 1979 -- I think here, in 1989, the public is much more informed and much more knowledgable about environmental concerns and technology and engineering than we were ten years ago. The country has made vast strides so that now, as part of a public service on your nightly national news -- I know ABC does a segment now on the environment about once a week.

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And so, I think you will find that the general public, in 1989, unlike what we were in 1979, is no longer mesmerized by claims that the technology that will be employed is state of the art. We used to think that was pretty exciting stuff and that we were on the cutting edge of some wonderful things. We have seen state of the art technology and we are not impressed, in many cases, with what happened.

Acton has been used as an example of treatment of contaminated water. In a similar way, as I understand it, in a way that's not dissimilar from what's being proposed here.

In talking with one of the Water Commissioners in Acton a couple of years ago, he confided that there had been a time when there was a breakdown in the system, and that for several hours the plant was not operating as it should have been, it was not working properly, and that error went undetected for several hours, all of which time, the water was not being purified, as the public had reason to believe. And so, very close at hand, we have an incident where sophisticated technology didn't work.

We also have heard the horror stories of the landfill liner down in New Jersey that was guaranteed to last for forty years and it didn't make

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three years. Here in Woburn, we tried out a latex cover out on the Industriplex site. That latex cover was supposed to last for several years and didn't get through the winter.

The simple truth is that, in spite of your best of intentions -- and I take them to be sincere, honest, good intentions -- the fact of the matter is that, in spite of the good intentions that you have, you are going to have a hard time overcoming fear and distrust. That's hard to earn and it's hard to get.

And, at this point, I'm not sure that the people of Woburn will ever feel comfortable or -- I shouldn't say all the people in Woburn, but many of the people of Woburn, a vast number, will ever feel comfortable trusting in technologies and in systems when they have seen others fail and betray them.

And so, I think we have to respect that, even though it may just be a perception rather than a reality. We are dealing with some things that have to be dealt with on the perception level as well.

Thank you.

MR. CAVAGNERO: Thanks.

MS. NEWMAN: Thank you.

MR. CAVAGNERO: Thank you all for coming. If there's no further-- Yes?

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MR. STOLLER: May I make a comment?

MS. NEWMAN: Sure, come on up.

Will you just tell who you are when you start?

MR. STOLLER: My name is Mark Stoller, and I'm with W. R. Grace.

I have a few brief comments.

The EPA remedy calls for source control and we agree with that, but we think the source control and treatment is appropriate at each site and not in the valley.

The EPA approves -- Grace has already submitted plans, we can be pumping and treating groundwater in an environmentally sound manner on our property this year instead of 1992, 1993 or later, as proposed by EPA.

Two years ago we did submit plans for a pilot test on our property. And last year, we installed groundwater pumping wells in anticipation of being able to proceed.

We think that this option would eliminate the need for constructing a network of pipelines to carry contaminated water throughout East Woburn, including through wetland areas. And furthermore, with treatment at our site we will know what it is that's in

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the water we are treating.

Down in the valley system, as proposed, would place anyone who operates it in a situation where, since much of the water will come from the river, we will -- or anybody who operates it -- will not be in a position to know what is in the water until it is in the wells.

We urge all other identified areas to commit themselves to source control and onsite treatment. And we believe, with that commitment, that we can proceed in a quick and efficient manner to deal with the problem.

Thank you.

MS. NEWMAN: Anybody else?

[No response from the audience]

MR. CAVAGNERO: Okay, again, thank you for your attendance.

The comment period does close on March 21st, and if you would like to make additional or written comments, you can send them to Barbara Newman's attention at the EPA in Boston. The address is in the proposed plan. And we will, again, be working -- Barbara will be working hard on the Record of Decision, which we hope to finalize somewhere around the May timeframe.

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Again, thank you for coming tonight.

MS. NEWMAN: Thank you.

(The public hearing closed at 8:20 p.m.)

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CERTIFICATE OF REPORTER AND TRANSCRIBER

This is to certify that the attached proceedings

before: RICHARD CAVAGNERO

in the Matter of:

PUBLIC HEARING ON

WELLS G AND H SUPERFUND SITE
WOBURN, MASSACHUSETTS

Place: Woburn, Massachusetts

Date: February 27, 1989

were held as herein appears, and that this is the true, accurate and complete transcript prepared from the notes and/or recordings taken of the above titled proceeding.

Laura Madi
Reporter

3/13/89
Date

Laura Madi
Transcriber

3/13/89
Date

WELLS G & H

APPENDIX B
ADMINISTRATIVE RECORD INDEX

Not included.

INTRODUCTION

This document is the Index to the Administrative Record for the Wells G & H National Priorities List (NPL) site. Section I of the Index cites site-specific documents, and Section II cites guidance documents used by the EPA staff in selecting a response action at the site.

The Administrative Record is available for public review at EPA Region I's Office in Boston, Massachusetts, and at the Woburn Public Library, 45 Pleasant Street, Woburn, MA 01801. Questions concerning the Administrative Record should be addressed to the EPA Region I site manager.

The Administrative Record is required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA).

SECTION I

SITE-SPECIFIC DOCUMENTS

ADMINISTRATIVE RECORD INDEX
for the
Wells G & H NPL Site

1.0 PRE-REMEDIAL

1.2 Preliminary Assessment

1. "Preliminary Site Assessment of Edward C. Whitney and Son," Ecology and Environment, Inc. (August 6, 1980).
2. "Preliminary Site Assessment of Metropolitan District Commission Septage Receiving Station," Ecology and Environment, Inc. (August 6, 1980).
3. "Preliminary Site Assessment of Surface Coatings, Inc. (Raffi & Swanson, Inc.)," Ecology and Environment, Inc.(August 6, 1980).
4. "Preliminary Site Assessment of Woburn Steel Drum, Inc.," Ecology and Environment, Inc. (August 6, 1980).
5. "Preliminary Site Assessment of Woburn Sanitary Landfill," Ecology and Environment, Inc.(August 6, 1980).
6. "Preliminary Site Assessment of Ritter Trucking Company, Inc.," Ecology and Environment, Inc. (August 6, 1980).
7. "Preliminary Site Assessment of New England Resins & Pigments," Ecology and Environment, Inc. (August 6, 1980).
8. "Preliminary Site Assessment of Aberjona Auto Parts," Ecology and Environment, Inc. (October 27, 1980).
9. "Preliminary Site Assessment for Whitney Barrel Company, Inc.," Ecology and Environment, Inc. (November 3, 1980).
10. "Preliminary Site Assessment for Independent Tallow Company Inc.," Ecology and Environment, Inc. (November 3,1980).
11. "Preliminary Site Assessment of John J. Riley Tannery," Ecology and Environment, Inc. (November 12,1980).
12. "Preliminary Site Assessment of Unifirst Corporation," NUS Corporation (September 24, 1985).

1.3 Site Inspection

1. "Site Inspection and Safety Plan for Raffi & Swanson, Inc. (Surface Coatings, Inc.)," Ecology and Environment, Inc. (August 14, 1980).
2. "Site Inspection and Safety Plan for Woburn Sanitary Landfill," Ecology and Environment, Inc. (August 15, 1980).
3. "Site Inspection and Safety Report for New England Resins and Pigments," Ecology and Environment, Inc.(August 28, 1980).
4. "Site Inspection Report of Surface Coatings, Inc. (Raffi & Swanson, Inc.)," Ecology and Environment, Inc.(September 16, 1980).
5. "Site Inspection Report for Woburn Steel Drum, Inc.," Ecology and Environment, Inc. (September 16, 1980).

1.3 Site Inspection (cont'd)

6. "Site Inspection Report for E.C. Whitney and Son, Inc.," Ecology and Environment, Inc.(September 16, 1980).
7. "Site Inspection Report for Ritter Trucking Company, Inc.," Ecology and Environment, Inc. (September 16, 1980).
8. "Site Inspection Report of Metropolitan District Commission Septage Receiving Station," Ecology and Environment, Inc. (September 17, 1980).
9. "Site Inspection Report of Woburn Sanitary Landfill," Ecology and Environment, Inc. (September 17, 1980).
10. "Site Inspection Plan of John J. Riley Company (a Division of Beatrice Foods)," Ecology and Environment, Inc. (November 13, 1980).
11. "Site Inspection Report of Aberjona Auto Parts," Ecology and Environment, Inc. (November 26, 1980).
12. "Site Inspection Report of John J. Riley Company (a Division of Beatrice Foods)," Ecology and Environment, Inc. (December 1, 1980).
13. "Site Inspection Report of Whitney Barrel Company, Inc.," Ecology and Environment, Inc. (December 16, 1980).
14. "Site Inspection Report of Atlantic Gelatin," Ecology and Environment, Inc. (December 17, 1980).
15. "Aberjona Auto Parts Draft Site Inspection Report," Ecology and Environment, Inc. (September 19, 1985).

1.7 Correspondence Related to Proposal of a Site to the NPL

1. Letter from L. Fucarile, Ecology and Environment, Inc. to W. Grandin, Metropolitan District Commission (December 4, 1980).

1.18 FIT Technical Direction Documents (TDD's) and Associated Records

1. "Inventory of Wells in the Woburn, Massachusetts Area," Ecology and Environment, Inc. (June 2, 1980).
2. "Site Entry Plan for Whitney Barrel Company, Inc.," Ecology and Environment, Inc. (November 4, 1980).
3. "Site Entry Plan of Atlantic Gelatin," Ecology and Environment, Inc. (November 19, 1980).
4. "Chlorinated Solvent Contamination of the Groundwater," Ecology and Environment, Inc. (March 8, 1982).
5. "Evaluation of the Hydrogeology and Groundwater Quality of East and North Woburn, Volumes I-IV," Ecology and Environment,Inc. (June 25, 1982). NOTE: Oversize "Surface Contour Maps 1-4" from Volume I are available for review at EPA Region I, Boston, Massachusetts.

2.0 REMOVAL RESPONSE

2.1 Correspondence

1. Letter from R.G. Bell, Jr., Clean Harbors, Inc. to Juniper Development (February 24, 1986).
2. Set of EPA Region I Meeting Notes, Olympia Nominee Trust Meeting (August 20, 1986).
3. Letter from R.J. Ankstitus, US EPA to L. Massery, Cooley, Manion, Moore & Jones (February 11, 1987).
4. EPA Region I Attendance List, Unifirst Corporation Meeting (April 21, 1987).
5. Set of EPA Region I Meeting Notes, Unifirst Corporation Meeting (April 21, 1987).
6. Set of EPA Region I Meeting notes, (B. Newman) Unifirst Corporation Meeting (April 21, 1987).
7. Internal EPA Region I Letter from B. Newman to R. Cavagnero, D. Lang, L. Evans, D. Delaney (April 22, 1987).
8. Set of EPA Region I Meeting Notes, Unifirst Corporation Meeting (July 7, 1987).
9. Set of Barbara Newman EPA Region I Meeting Notes, Unifirst Corporation (July 7, 1987).
10. Letter from J. Bates, Goodwin, Procter & Hoar to P. Boxell, EPA Region I (September 22, 1987).
11. Set of EPA Region I Telephone Notes, EPA Region I/Jeff Bates, Goodwin, Procter & Hoar.

2.3 Sampling and Analysis Data

1. "Report of Analysis," Clean Harbors of Natick, Inc. (October 29, 1985).
2. "Polychlorinated Biphenyl and Pesticide Analysis in Sediment and Soil - Olympia Trust Realty, Woburn, MA" (via Internal EPA Region I Letter from M. Lee to R. Ankstitus) (January 28, 1987).

2.5 On-Scene Coordinator Report

1. "Technical Assistance Team Report for January - February, 1986," Roy F. Weston, Inc. (February 25, 1986).
2. "Juniper Realty Drum Site Private Responsible Party Cleanup," Roy F. Weston, Inc. (May 29, 1986).

3.0 REMEDIAL INVESTIGATION (RI)

3.1 Correspondence

1. Letter from V.A. Forte, Cryovac Division, W.R. Grace & Company to M. Hohman, EPA Region I and W. St. Hillaire, Massachusetts Department of Environmental Quality Engineering (April 28, 1983).
2. EPA Region I Meeting Notes, Interstate Uniform Company Meeting (May 13, 1983).
3. EPA Region I Attendance List, Meeting with Environmental Research & Technology, Inc., Goodwin, Procter & Hoar, Interstate Uniform, and the Massachusetts Department of Environmental Quality Engineering (May 18, 1983).
4. Letter from W.J. Cheeseman, Foley, Hoag & Eliot to L. Stiller Rikleen, EPA Region I (May 18, 1983). Concerning response to the order issued by EPA Region I on May 9, 1983.
5. Letter from W.J. Cheeseman, Foley, Hoag & Eliot to L. Stiller Rikleen, EPA Region I (June 1, 1983). Concerning Addendum to the Work Plan.
6. Set of EPA Region I Telephone Notes, EPA Region I/J. Bates, Goodwin, Procter & Hoar (June 10, 1983).
7. Set of EPA Region I Telephone Notes/J. Bates, Goodwin, Procter & Hoar (October 31, 1983).
8. Letter from L. Stiller Rikleen, EPA Region I to W.J. Cheeseman, Foley, Hoag & Eliot (January 11, 1984).
9. Letter from L. Stiller Rikleen, EPA Region I to M. J. Rodburg, Lowenstein, Sandler, Brockin, Kohl, Fisher, Boylan & Meaner (January 30, 1984).
10. "Technical Oversight of Beatrice Well Emplacement," Internal NUS Corporation Memo (August 6, 1984).
11. Letter from W.J. Cheeseman, Foley, Hoag & Eliot to L. Stiller Rikleen, EPA Region I (August 8, 1984).
12. Letter from L. Hogan, Environmental Research & Technology, Inc. to D. Delaney, EPA Region I (January 18, 1985).
13. Letter from D. Chin, EPA Region I to R.W. Simonds, City of Woburn Department of Public Works (July 9, 1985).
14. Letter from M. Stoler, W.R. Grace & Company to D. Delaney, EPA Region I (July 19, 1985). Concerning Sanitary System layout for Cryovac Plant.
15. Letter from J.P. Imse, Weston Geophysical Corporation to D. Delaney, EPA Region I (September 30, 1985).
16. Letter from J. Stewart, Lowenstein, Sandler, Brochin, Kohl, Fisher, Boylan & Meanor to D. Delaney, EPA Region I (November 8, 1985). Concerning comments on the Wells G & H Aquifer Pump Test.
17. Letter from J.H. Guswa, GeoTrans to Mark Stoler, W.R. Grace and Company (December 7, 1987). Concerning attached letter report regarding the Cryovac Plant sanitary system.

3.1 Correspondence (cont'd)

18. Letter from R.C. Niles, W.R. Grace & Company to L. Evans and R. Chalpin, EPA Region I (February 5, 1986).
19. Letter from R.M. Nugent, Woodward-Clyde Consultants to D. Delaney, EPA Region I (February 19, 1986).
20. Set of EPA Region I Notes to File (September 17, 1986). Concerning information for work at Cryovac site.
21. Letter from M. Stoler, W.R. Grace & Company to B. Newman, EPA Region I (July 31, 1987).
22. Letter from B. Newman, EPA Region I to D. Porteous, EPA Region I (August 19, 1987). Concerning Request for Assistance.
23. Letter from M. Stoler, W.R. Grace & Company to B. Newman, EPA Region I (September 25, 1987).
24. Letter from J. Cleary, Ebasco Services, Inc. to B. Newman, EPA Region I (October 22, 1987). Concerning modification to W.R. Grace & Company Sampling Plan.
25. Internal EPA Region I Letter from B. Newman to D. Porteous (Regarding Request for Assistance) (October 30, 1987).
26. Letter from B. Newman, EPA Region I to M. Stoler, W.R. Grace & Company (November 2, 1987).
27. Letter from M. Stoler, W.R. Grace & Company to B. Newman, EPA Region I (December 8, 1987).
28. Letter from Barbara Newman, EPA Region I to Julio Olimpio, United States Geological Survey (February 18, 1988). Concerning zone of contribution of the Riley well.
29. Letter from Julio Olimpio, United States Geological Survey to Barbara Newman, EPA Region I (March 2, 1988). Concerning clarification of zone of contribution of the Riley well.
30. Letter from Julio Olympio, United States Geological Survey to Barbara Newman, EPA Region I (December 20, 1988). Concerning new survey data in the vicinity of Wells G & H.
31. Memorandum from Stan Rydell, EPA Region I to Barbara Newman, EPA Region I (January 19, 1989). Concerning the analysis and comparison of the results of radionuclide tests on Well #S22 at the site.

3.2 Sampling and Analysis Data

1. Sampling and Analysis Data, Tighe & Bond Consulting Engineers (February 19, 1986).
2. Internal EPA Region I letter from E.J. Kim to B. Newman (transmittal of Unifirst Corporation Sample Results) (July 2, 1987).
3. Internal EPA Region I letter from E.J. Kim to B. Newman (November 20, 1987). Concerning Unifirst Corporation overview and split sampling with ERT contractors.

3.2 Sampling and Analysis Data (cont'd)

4. Technical Reports for GeoTrans by Environmental Testing and Certification, for sample dates October 28, 29, 30; November 3; and December 22, 1987. (W.R. Grace & Company's results from split sampling with Ebasco, Fall 1987) [via transmittal letter from Mark Stoler, W.R. Grace & Company to Gretchen Muench, EPA Region I (January 12, 1989)].
5. Letter from E.J. Kim, EPA Region I to B. Newman, EPA Region I (January 5, 1988). Concerning Unifirst Corporation sample results from November 30, 1987.
6. Letter from E.J. Kim, EPA Region I to B. Newman, EPA Region I (January 26, 1988). (Transmittal of VOA split sampling with ERT results from October 28, 1987).
7. Letter from D. Granz, EPA Region I to B. Newman, EPA Region I (February 26, 1988). Concerning Unifirst Corporation - Gas Chromatography-Mass Spectrometry analysis of extractable organics in municipal and industrial discharges.
8. Set of Sampling and Analysis Data, Roy F. Weston, Inc. (March 16, 1988).
9. "Residential Indoor Air Sampling Results, Wells G & H Superfund Site, Woburn, Massachusetts," EPA Region I (June 1989).
10. "Soil Sampling of the Wells G & H Superfund Site" (W.R. Grace & Company and Olympia Nominee Trust), EPA Region I (July/August 1989). NOTE: Data Validation Packages are available for review at EPA Region I, Boston, Massachusetts.

* *Other Sampling and Analysis Data for the Remedial Investigation may be reviewed, by appointment only, at EPA Region I, Boston, Massachusetts.*

3.4 Interim Deliverables

1. "Geophysical Survey W.R. Grace Site," International Exploration, Inc. for GeoEnvironmental Consultants, Inc. (April 1983).
2. "Field Investigations and Remedial Measures Interim Report," GeoEnvironmental Consultants, Inc. (August 1983).
3. "Assessment of Ground Water Contamination Potential at Interstate Uniform Services Corporation," Environmental Research & Technology, Inc. (October 1983).
4. "Field Investigations and Remedial Measures Phases I-III Final Report," GeoEnvironmental Consultants, Inc. (May 1984). NOTE: Oversize "Topographic Plan of Land in Woburn, MA" Plates I-II are available for review at the EPA Region I, Boston, Massachusetts.
5. "Summary of Monitoring Program Unifirst Corporation," Environmental Research & Technology, Inc. (via transmittal letter from J.C. Bates, Goodwin, Procter & Hoar to D. Delaney, EPA Region I, August 22, 1984) (August 15, 1984).

3.4 Interim Deliverables (cont'd)

6. "Evaluation and Recommendations for Alternatives Concerning Additional Investigation of Ground-Water Contamination," Environmental Research & Technology, Inc. (via transmittal letter from R.K. Schnoor, Goodwin, Procter & Hoar to J. Owens, EPA Region I, September 24, 1984) (September 24, 1984).
7. "Phase II Groundwater Investigation J.J. Riley Site," Woodward-Clyde Consultants (November 1, 1984).
8. "Field Investigations and Remedial Measures Phase VI - Field Descriptions," GeoEnvironmental Consultants, Incorporated (August 1985).
9. Letter from J. Loitherstein, Coffin & Richardson Consulting Engineers to D. Delaney, EPA Region I (November 5, 1985). Concerning Coffin & Richardson's planned test program to determine the integrity of the sanitary system at the Cryovac Plant site.
10. "Subsurface Investigation and Observation Well Installation Aberjona River, Wells G & H Site," Atlantic Testing Laboratories, Limited (December 2, 1985).
11. "Final Field Operations Plan Supplemental Remedial Investigation/Feasibility Study," EBASCO Services Inc. (August 1987).
12. "Area of Influence and Zone of Contribution to Superfund Site Wells G and H," U.S. Geological Survey (1987). NOTE: Oversize "Area of Influence Plates 1-6" are available for review at EPA Region I, Boston, Massachusetts.

3.5 Applicable or Relevant and Appropriate Requirements

1. Letter from D. D'Amore, Division of Water Supply, Massachusetts Department of Environmental Quality Engineering to B. Newman, EPA Region I (June 23, 1987). Concerning Applicable DWS ARAR's.

3.6 Remedial Investigation (RI) Reports

1. "Wells G & H Site Remedial Investigation Report Part I Volumes I-IV," NUS Corporation Superfund Division (October 17, 1986). NOTE: Oversize Volume II Plates 1-9 are available for review at EPA Region I, Boston, Massachusetts.
2. "Wells G & H Remedial Investigation Part II Final Report," Alliance Technologies Corporation (November 1986).
3. "Review of EPA Report Titled Wells G & H Site Remedial Investigation Report," GeoTrans, Inc. (8 volumes) (July 1987).

4. "Final Supplemental Remedial Investigation for Feasibility Study" (includes Appendices A-F), Ebasco Services Incorporated (December 1988). Note: Oversize maps of "Monitoring Well Locations" and "Volatile Organic Compounds in Groundwater 1987" are available for review, by appointment only, at EPA Region I, Boston, Massachusetts.

3.7 Work Plans and Progress Reports

1. "Field Investigations and Remedial Measures Supplemental Workplan," GeoEnvironmental Consultants, Inc. (April 1984). NOTE: Oversize map "Topographic Plan of Land in Woburn, MA Phase IV" is available for review at EPA Region I, Boston, Massachusetts.
2. "Scope of Work for a Remedial Investigation at Wells G & H Site," NUS Corporation Superfund Division (October 19, 1984).
3. "Remedial Investigation Phases VI-VIII Work Plan," GeoEnvironmental Consultants, Inc. (June 25, 1985).
4. "Work Plan USGS Assistance of EPA Region I Wells G and H, Woburn, Massachusetts," US Department of the Interior (via transmittal letter from J. Olimpio, U.S. Department of the Interior to D. Gagne, EPA Region I) (December 9, 1985).
5. "Final Work Plan Supplemental Remedial Investigation/ Feasibility Study," Ebasco Services Inc. (September 1987).
6. "Review Comments Regarding EPA Final Work Plan Supplemental Remedial Investigation/Feasibility Study," GeoTrans, Inc. (February 1988). [via transmittal letter from Mark Stoler, W.R. Grace & Company to Gretchen Muench, EPA Region I (February 17, 1988)].

3.9 Health Assessments

1. "Toxicological Profile for Tetrachloroethylene," Agency Toxic Substances and Disease Registry (ATSDR) (December 1987).
2. "Toxicological Profile for Trichloroethylene," Agency for Toxic Substances and Disease Registry (ATSDR) (January 1988).

3.10 Endangerment Assessments

1. "Endangerment Assessment for the Wells G & H Site" (includes Appendices A-F), Clement Associates, Incorporated for Ebasco Services Inc. (December 1988).

4.0 FEASIBILITY STUDY (FS)

4.1 Correspondence

1. Cross-Reference: Letter from Gretchen Muench, EPA Region I to Wildwood Conservation Corporation, Riley Leather Company, Inc., and Wedel Corporation c/o Mary Ryan, Nutter, McClennan & Fish (January 5, 1989). Concerning Riley Leather Company, Incorporated plans to cease operation some time this month. [Filed and cited as entry number 143 in 11.9 PRP Specific Correspondence.]
2. Telephone Notes between Gretchen Muench, EPA Region I and Mark Stoler, W.R. Grace & Company (January 8, 1989).
3. Telephone Notes between Gretchen Muench, EPA Region I and Jeff Bates, UniFirst Corporation (January 8, 1989).
4. Letter from Mark Stoler, W.R. Grace & Company to Gretchen Muench, EPA Region I (February 10, 1989). Concerning request for back-up documents from the Feasibility Study Report.
5. Letter from John Zannos, EPA Region I to Mark Stoler, W.R. Grace & Company (March 1, 1989). Concerning response to W.R. Grace & Company's letter of February 10, 1989 requesting back-up documentation from Feasibility Study.
6. Telephone Notes between Gretchen Muench, EPA Region I and Attorney for the Massachusetts Rifle Association (March 15, 1989).
7. Telephone Notes between Gretchen Muench, EPA Region I and Jeff Bates, UniFirst Corporation (March 17, 1989).
8. Telephone Notes between Gretchen Muench, EPA Region I and Neil Glick, New England Plastics (March 20, 1989).
9. Telephone Notes between Gretchen Muench, EPA Region I and Jay Stewart, Beatrice Foods (March 1989).

4.4 Interim Deliverables

1. "Wells G&H Wetlands Assessment Final Report," Alliance Technologies Corporation (March 25, 1986). NOTE: Oversize "Location of Wetland Areas Plate 1" (February 1987) is available for review at EPA Region I, Boston, Massachusetts.
2. Letter from Pi-Yun Tsai, EPA Region I to Barbara Newman, EPA Region I (August 25, 1988). Concerning development of soil cleanup levels for lead.

4.5 Applicable or Relevant and Appropriate Requirements(ARARs)

1. Letter from Jay Naparstek, Massachusetts Department of Environmental Quality Engineering to Barbara Newman, EPA Region I (January 19, 1989). Concerning identification of State ARARs.

4.6 Feasibility Study (FS) Reports

1. "Draft Final Feasibility Study Report, Wells G & H Site" (includes Appendices A-D), Ebasco Services, Incorporated (January 1989).

Comments on the Feasibility Study received by EPA Region I during the formal public comment period on the Feasibility Study and Proposed Plan are filed and cited in 5.3 Responsiveness Summaries.

2. "PLASM Groundwater Flow Model" (discussed in Appendix C of the Feasibility Study Report), Ebasco Services, Incorporated (February 1989). Computer disk is available for review, by appointment only, at EPA Region I, Boston, Massachusetts.
3. Letter and data package from Lewis Horzempa, Ebasco Services Incorporated to Barbara Newman, EPA Region I (March 22, 1989). Concerning transmittal of Feasibility Study back-up cost calculations.
4. "Economic Evaluation of Trichloroethylene Removal from Contaminated Ground Water by Packed Column Air Stripping," Michael D. Cummins, USEPA [via transmittal letter from Lewis Horzempa, Ebasco Services Inc. to Barbara Newman, EPA Region I (March 23, 1989)]. Concerning "FS Air Stripping Efficiency Evaluations."

4.9 Proposed Plans for Selected Remedial Action

1. Letter from Barbara Newman, EPA Region I to Jay Naparstek, Massachusetts Department of Environmental Quality Engineering (December 7, 1988). Concerning transmittal of the Proposed Plan for the Wells G & H Superfund Site.
2. Letter from Barbara Newman, EPA Region I to Rodine DeRice, Massachusetts Department of Environmental Quality Engineering (December 7, 1988). Concerning transmittal of the Proposed Plan for the Wells G & H Superfund Site.
3. "Proposed Plan for the Wells G & H Site," ICF Technology, Incorporated for Ebasco Services Inc. (February 1989).

Comments on the Proposed Plan received by EPA Region I during the formal public comment period on the Feasibility Study and Proposed Plan are filed and cited in 5.3 Responsiveness Summaries.

5.0 RECORD OF DECISION

5.2 Applicable or Relevant and Appropriate Requirements (ARARs)

1. Memorandum from Karina Thomas, Envirosphere Company to the File (January 6, 1989). Concerning previous evaluations of the Land Disposal Restrictions' (LDR) impact on the Wells G & H Site.

5.3 Responsiveness Summaries

1. Cross-Reference: Responsiveness Summary is Appendix A of the Record of Decision [Filed and cited as entry number 1 in 5.4 Record of Decision (ROD)].

The following citations indicate documents received by EPA Region I during the formal public comment period.

2. Comments Dated February 8, 1989 from William J. Murphy, Woburn Conservation Commission on the Proposed Plan for cleanup of Wells G & H Superfund Site.
3. Comments Dated February 14, 1989 from Herbert Meyer, Mystic River Watershed Association, Inc. on the Proposed Plan and the Feasibility Study (FS) Meeting for Wells G & H Superfund Site in the Woburn Town Hall on February 9, 1989.
4. Comments Dated February 16, 1989 from Kenneth McAveeney, Woburn Resident on the Proposed Plan.
5. Comments Dated February 27, 1989 from Herbert Meyer, Mystic River Watershed Association, Inc. on the Woburn meeting of February 9, 1989 on the Wells G & H Superfund Site.
6. "Public Hearing on the Feasibility Study for the Wells G & H Superfund Hazardous Waste Site in Woburn, MA," For A Cleaner Environment, Inc. (February 27, 1989). Concerning comments specific to the Feasibility Study for the cleanup of the Wells G & H site.
7. Comments Dated March 6, 1989 from Herbert Meyer, Mystic River Watershed Association, Inc. on update of letter from February 14 after the Public Hearing on the remedial plan for the Wells G & H Superfund site in the Woburn City Hall on February 27, 1989.
8. Comments Dated March 11, 1989 from Paul A. Medeiros, Woburn Resident on the proposed cleanup of Wells G & H.
9. Comments Dated March 21, 1989 from James L. McKeown, Cummings Properties on EPA's Proposed Cleanup Plan for Wells G & H Superfund Site.
10. Comments Dated March 21, 1989 from Mark Stoler, W.R. Grace & Company on the EPA Feasibility Study and Proposed Plan for Woburn Wells G & H.

11. Comments Dated March 21, 1989 from Louis N. Massery, Cooley, Manion, Moore & Jones, P.C. (Attorney for George Whitten, Olympia Nominee Trust, and Juniper Development) on EPA's proposed plan for cleanup at the Wells G & H site.
12. Comments Dated March 21, 1989 from Colburn T. Cherney, Ropes & Gray (Attorney for Charrette Corporation) on suggestion that Charrette Corporation is inappropriately designated as a Potentially Responsible Party.
13. Comments Dated March 21, 1989 from George B. Henderson, II, Nutter, McClennen & Fish (Attorney for John J. Riley, Jr., John J. Riley Company, Inc., and Wildwood Conservation Corporation) on the proposed cleanup plan for Wells G & H Superfund Site.
14. Comments Dated March 21, 1989 from Edward J. Markey, U.S. House of Representatives on EPA's proposed cleanup plan for Wells G & H Superfund Site in Woburn, Massachusetts.
15. Comments Dated March 21, 1989 from Jeffrey C. Bates and Christopher P. Davis, Goodwin, Procter & Hoar (Attorneys for UniFirst Corporation) on legal comments concerning EPA's proposed remedy for Woburn Wells G & H.
16. Comments Dated March 21, 1989 from Jeffrey C. Bates, Goodwin, Procter & Hoar (Attorney for UniFirst Corporation) on two additional sets of UniFirst comments on EPA's proposed remedy for Woburn Wells G & H.
17. Comments Dated March 21, 1989 from James Stewart, Lowenstein, Sandler, Kohl, Fisher & Boylan (Attorney for Beatrice Foods Company) on the Proposed Plan for cleanup of Wells G & H Site -Woburn, Massachusetts.
18. Comments Dated March 21, 1989 from Edward F. George, Jr., Rome & George (Attorney for the Massachusetts Rifle Association) on response of MRA to EPA cleanup plan of February 1989.
19. "Technical Report on the Woburn, Massachusetts Wells G & H Site (includes Appendices 1 - 25)," John A. Cherry, Ph.D., Martin L. Johnson, Ph.D. P.E., Rudolph J. Jaeger, Ph.D., DABT and ENSR Consulting and Engineering, The Johnson Company, Inc., Environmental Medicine, Inc. (March 1989).
20. "Review Comments Regarding the U.S. Environmental Protection Agency, January 1989, Draft Final Feasibility Study Report, Wells G & H Site, Woburn, Massachusetts," prepared for W.R. Grace & Company by GeoTrans, Inc. (March 1989).
21. Comments Dated March 21, 1989 from Franklin G. Stearns, Brown, Rudnick, Freed & Gesmer (Attorney for New England Plastics Corporation) on the EPA cleanup plan for Wells G & H Superfund Site [via letter transmitting correction of comments (April 25, 1989)].

5.4 Record of Decision (ROD)

1. "Wells G & H Record of Decision - ROD Decision Summary," EPA Region I (September 14, 1989).

9.0 STATE COORDINATION

9.1 Correspondence

1. Letter from J. Vetere, Massachusetts Water Resources Authority to B. Newman, EPA Region I (June 12, 1987). Concerning the Wilmington extension sewer.
2. Set of EPA Region I Telephone Notes, B. Newman, EPA Region I/R. Cleary, Massachusetts Department of Environmental Quality Engineering (October 20, 1987).
3. Meeting Notes, EPA Region I and Massachusetts Water Resources Authority (March 10, 1988).
4. Letter from Barbara Newman, EPA Region I to Rodine DeRice, Massachusetts Department of Environmental Quality Engineering (May 10, 1988). Concerning groundwater divide at site and EPA Region I's recommendation to add sites to list of State's planned investigations.
5. Letter from Daniel S. Greenbaum, Massachusetts Department of Environmental Quality Engineering to Merrill Hohman, EPA Region I (September 21, 1988). Concerning State's position regarding proposed remedial alternatives.
6. Letter from Barbara Newman, EPA Region I to Jay Naparstek, Massachusetts Department of Environmental Quality Engineering (October 24, 1988). Concerning EPA's request for State to explain attainment of State ARARs.
7. Letter from Barbara Newman, EPA Region I to Jay Naparstek, Massachusetts Department of Environmental Quality Engineering (December 7, 1988). Concerning list of contaminants and target levels.
8. Letter from Richard Cavagnero, EPA Region I to Robert Bois, Massachusetts Department of Environmental Quality Engineering. Concerning agreement between EPA Region I and the State to coordinate efforts.
9. Letter from Barabara Newman, EPA RegionI to Jay Naparstek, Massachusetts Department of Environmental Quality Engineering (April 3, 1989). Concerning transmittal of complete set of all comments received on the Proposed Plan, Feasibility Study and Remedial Investigation.

10.0 ENFORCEMENT

10.1 Correspondence

1. Letter from B. Newman and L. Gollins Evans, EPA Region I to R. Cavagnero, EPA Region I (October 23, 1986).

10.7 Administrative Orders

1. Administrative Order, Beatrice Foods, Inc. (May 9, 1983).
2. Administrative Order, Interstate Uniform Services, Corporation (May 9, 1983)
3. Administrative Order, W.R. Grace & Company; Cryovac, Inc. (May 9, 1983).
4. Administrative Order, W.R. Grace & Company (June 13, 1983).
5. Administrative Consent Order, Interstate Uniform Services, Corporation (September 29, 1983)
6. Administrative Order and Agreement, Beatrice Foods, Inc. (September 30, 1983).
7. Administrative Order, Wildwood Conservation Corporation (With letter attached transmitting Administrative Order from M. Hohman, EPA Region I to J.J. Riley, Wildwood Conservation Corporation, December 13, 1985) (December 12, 1985).
8. Amended Administrative Order, Wildwood Conservation Corporation (January 27, 1986).
9. Administrative Order, George D. Whitten, Charles D. Whitten, and Amy Whitten, as Trustees of the Olympia Nominee Trust (February 7, 1986).
10. Administrative Order, George D. Whitten, Charles D. Whitten, and Amy Whitten, as Trustees of the Olympia Nominee Trust (February 17, 1987).
11. Administrative Order by Consent, Unifirst Corporation (With letter attached transmitting consent order from M. Hohman, EPA Region I to A.A. Croatti, Unifirst Corporation, September 25,1987) (September 28, 1987).

10.11 PRP Enforcement Work Plans

1. Scope of Work, Beatrice Foods (through the services of Woodward-Clyde Consultants) (via transmittal letter from M. Rodburg, Lowenstein, Sandler, Brochin, Kohl, Fisher, Boylan and Meanor Counsellors at Law to L. Stiller Rikleen, EPA Region I) (August 10, 1983).
2. "Unifirst Corporation Monitoring Well Sampling Work/QA Plan Short Form," EPA Region I (November 17, 1987).
3. Letter from J.T. Lawson, Environmental Research & Technology, Inc. to B. Newman, EPA Region I (December 21, 1987).

10.11 PRP Enforcement Work Plans (cont'd)

4. "Additional Investigation of Unifirst Corporation," Environmental Research & Technology, Inc.

11.0 POTENTIALLY RESPONSIBLE PARTY (PRP)

11.3 Contractor Work Plans and Progress Reports

1. Letter from S. Gaudet, Environmental Research & Technology, Inc. to B. Newman, EPA Region I (Regarding ERT's deep bedrock aquifer test and map of elevations from recently installed wells) (February 23, 1988). NOTE: Oversize "Sketch of Wells on Olympia Avenue Woburn, MA" (February 10, 1988) is available at EPA Region I, Boston, Massachusetts.

11.8 Site-Specific Contractor Deliverables

1. "Summary of Investigation - UniFirst Site - Woburn, Massachusetts," ERT for UniFirst Corporation (February 1988). (via transmittal letter from Jeffery Lawson, ERT to Barbara Newman, EPA Region I) (February 17, 1988).

11.9 PRP-Specific Correspondence

ADAP

1. Request for Information from EPA Region I to ADAP (May 10, 1983).
2. Answers to EPA Request for Information, ADAP (May 31, 1983).

ABERJONA AUTO PARTS, INC.

3. Request for Information from EPA Region I to Aberjona Auto Parts Inc. (December 31, 1987).
4. Answers to EPA Request for Information, Aberjona Auto Parts Inc. (January 27, 1988).

ALLIED VAN LINES

5. Request for Information from EPA Region I to Allied Van Lines (May 10, 1983).
6. Answers to EPA Request for Information, Allied Van Lines (May 17, 1983).

ARLWOOD, INC.

7. Request for Information from EPA Region I to Arlwood, Inc. (May 10, 1983).
8. Answers to EPA Request for Information, Arlwood, Inc.(August 5, 1983).

BEATRICE FOODS COMPANY

9. Request for Information from EPA Region I to Beatrice Foods Company (June 15, 1986).

11.9 PRP-Specific Correspondence (cont'd)

BEATRICE FOODS COMPANY (cont'd)

10. Answers to EPA Request for Information, Beatrice Foods Company (June 30, 1986).
11. Request for Information from M. Hohman, EPA Region I to D. Kelly, Beatrice Foods Corporation (February 22, 1988).
12. Letter from Neil Jacobs, Hale and Dorr (Attorney for Beatrice Foods Company) to Gretchen Muench, EPA Region I (March 9, 1988). Concerning EPA's request for information.
13. Letter from Neil Jacobs, Hale and Dorr (Attorney for Beatrice Company) to Gretchen Muench, EPA Region I (March 14, 1988). Concerning transmittal of a copy of the response to EPA's Request for Information.
14. Answers to EPA Request for Information, Beatrice Foods Company (March 14, 1988).
15. Notice of Potential Liability from EPA Region I to Beatrice Company (April 20, 1988).
16. Supplementary discovery information required of Beatrice Company submitted to EPA on February 22, 1989 by Mary Ryan (Nutter, McClennen & Fish) on behalf of the John J. Riley Company, Inc., the Wildwood Conservation Corporation, and the Wedel Corporation.

BRISTOL TERMINALS

17. Letter from Merrill Hohman, EPA Region I to Bristol Terminals, Incorporated (February 3, 1989). Concerning Notice of Potential Liability.

BRODIE INC.

18. Answers to EPA Request for Information, Brodie Inc. (June 10, 1983).

CHARRETTE, INC.

19. Request for Information from L. Sutton, EPA Region I to Charrette, Inc. (May 10, 1983).
20. Answers to EPA Request for Information, Charrette, Inc. (June 10, 1983).
21. Request for Information from EPA Region I to Charrette, Inc. (August 18, 1987).
22. Answers to EPA Request for Information from J.M. Balding, Charrette, Inc. to M. Hohman, EPA Region I (August 25, 1987).
23. Answers to EPA Request for Information, Charrette Inc. (August 1987). NOTE: Oversize "Plumbing Site Plan" is available for review at EPA Region I, Boston, Massachusetts.
24. Letter from Merrill Hohman, EPA Region I to Mark Balding, Charrette Inc. (February 3, 1989). Concerning Notice of Potential Liability.

11.9 PRP-Specific Correspondence (cont'd)

CHARRETTE, INC. (cont'd)

25. Letter from Colburn T. Cherney, Ropes & Gray (Attorney for Charrette Inc.) to Barbara Newman, EPA Region I (February 9, 1989). Concerning response to the correspondence dated February 3, 1989 from Merrill S. Hohman, EPA Region I.

CONTINENTAL METAL PRODUCTS COMPANY, INC.

26. Request for Information from P. Keough, EPA Region I to Continental Metal Products Company, Inc. (June 10, 1983).

CONTINENTAL METAL PRODUCTS COMPANY, INC.

27. Answers to EPA Request for Information, Continental Metal Products Company, Inc. (June 21, 1983).

CREST BUICK

28. Request for Information from L. Sutton, EPA Region I to Crest Buick (May 10, 1983).
29. Answers to EPA Request for Information, Crest Buick (May 23, 1983).

CUMMINGS PROPERTIES

30. Request for Information from EPA Region I to Cummings Properties (July 31, 1987).
31. Answers to EPA Request for Information, Cummings Properties (August 28, 1987). NOTE: Oversize "Drainage and Sewer System Plans" attachment 6-15 are available for review at EPA Region I, Boston, Massachusetts.
32. Letter from Merrill Hohman, EPA Region I to Cummings Properties Management, Incorporated (February 3, 1989). Concerning Notice of Potential Liability.

DONALD M. MANZELLI, INC.

33. Request for Information from L. Carothers, EPA Region I to Donald M. Manzelli Inc. (January 15, 1982).
34. Answers to EPA Request for Information, Donald M. Manzelli Inc. (January 30, 1982).

ECONOMICS LABORATORY, INC.

35. Request for Information from P. Keough, EPA Region I to Economics Laboratory Inc. (June 10, 1983).
36. Answers to EPA Request for Information, Economics Laboratory, Inc. (July 15, 1983).

GERARD REALTY COMPANY

37. Letter from Merrill Hohman, EPA Region I to Gerard Realty Company (February 3, 1989). Concerning Notice of Potential Liability.

HAMILTON/AVNET ELECTRONICS

38. Request for Information from L. Sutton, EPA Region I to Hamilton/Avnet Electronics (May 10, 1983).
39. Answers to EPA Request for Information, Hamilton/Avnet Electronics (May 17, 1983).

11.9 PRP-Specific Correspondence (cont'd)

HEMINGWAY TRANSPORT, INC.

40. Request for Information from L. Sutton, EPA Region I to Hemingway Transport, Inc. (May 10, 1983).
41. Answers to EPA Request for Information, Hemingway Transport, Inc. (June 9, 1983).
42. Letter from Merrill Hohman, EPA Region I to Hemingway Transport, Incorporated (c/o Herbert Kahn, Trustee in Bankruptcy) (February 3, 1989). Concerning Notice of Potential Liability.

INGERSOLL-RAND COMPANY

43. Letter from Merrill Hohman, EPA Region I to Ingersoll-Rand Company (February 3, 1989). Concerning Notice of Potential Liability.

INDEPENDENT TALLOW COMPANY, INC.

44. Request for Information from P. Keough, EPA Region I to Independent Tallow Company, Inc. (June 10, 1983).
45. Answers to EPA Request for Information, Independent Tallow Company, Inc. (June 30, 1983).

JOHN J. RILEY COMPANY

46. Letter from J.J. Riley, Jr., John J. Riley Company to L. Benevides, Massachusetts Department of Environmental Quality Engineering (April 22, 1983).
47. Letter from D.A. Huebner, EPA Region I to J.J. Riley, John J. Riley Company, Inc. (January 20, 1984).
48. Letter from J.J. Riley, Jr., John J. Riley Company, Inc. to W.F. Cass, Massachusetts Department of Environmental Quality Engineering (January 25, 1984).
49. Answers to EPA Request for Information from M.K. Ryan, Nutter, McClennen & Fish to B. Newman, EPA Region I (Regarding J.J. Riley Company) (October 14, 1986).
50. Request for Information from M. Hohman, EPA Region I to J.J. Riley, John J. Riley Company, Inc. (November 1986).
51. Answers to EPA Request for Information from M.K. Ryan, Nutter, McClennen & Fish to B. Newman or G. Ruta, EPA Region I (includes 8 exhibits) (December 12, 1986). Concerning the John J. Riley Company Inc.
52. Request for Information from M. Hohman, EPA Region I to J.J. Riley, John J. Riley Company (October 13, 1987).
53. Answers to EPA Request for Information, John J. Riley Company, Inc. (November 13, 1987).
54. Answers to EPA Request for Information, John J. Riley Company, Inc. (November 23, 1987). NOTE: Oversize "Map of Proposed Structure" is available for review at EPA Region I, Boston, Massachusetts.
55. Letter from Merrill Hohman, EPA Region I to John J. Riley, John J. Riley Company Incorporated (February 3, 1989). Concerning Notice of Potential Liability.

11.9 PRP-Specific Correspondence (cont'd)

JUNIPER DEVELOPMENT GROUP

56. Letter from Merrill Hohman, EPA Region I to George Whitten, Juniper Development Group (February 3, 1989). Concerning Notice of Potential Liability.

RILEY LEATHER COMPANY

57. Letter from C. Sheehan, Riley Leather Company, Incorporated to D. Delaney, EPA Region I (December 11, 1987).
58. Request for Information from B. Newman, EPA Region I to C. Sheehan, Riley Leather Company, Incorporated (May 16, 1988).
59. Answers to EPA Request for Information from C. Sheehan, Riley Leather Company, Incorporated to B. Newman, EPA Region I (May 25, 1988).

MASSACHUSETTS RIFLE ASSOCIATION

60. Letter from Merrill Hohman, EPA Region I to President, Massachusetts Rifle Association (February 3, 1989). Concerning Notice of Potential Liability.

McKESSON DRUG COMPANY

61. Request for Information from P. Keough, EPA Region I to McKesson Drug Company (June 10, 1983).
62. Answers to EPA Request for Information, McKesson Drug Company (July 6, 1983).

MURPHY'S WASTE OIL SERVICES, INC.

63. Request for Information from M. Hohman, EPA Region I to J. Murphy, Murphy's Waste Oil Services Inc. (December 31, 1987).
64. Answers to EPA Request for Information from R. Backman, Wright and Moehrke Counsellors at Law to Barbara Newman, EPA Region I (regarding Murphy's Waste Oil Services Inc.) (January 22, 1988).

NEW ENGLAND PLASTICS CORPORATION

65. Request for Information from P. Keough, EPA Region I to New England Plastics Corporation (June 10, 1983).
66. Answers to EPA Request for Information, New England Plastics Corporation (July 6, 1983).
67. Request for Information from M. Hohman, EPA Region I to New England Plastics Corporation (July 22, 1987).
68. Answers to EPA Request for Information, New England Plastics Corporation (August 1987).
69. Notice of Liability from EPA Region I to New England Plastics Corporation (April 20, 1988).
70. Request for Information from EPA Region I to R. Kearin, New England Plastics Corporation (May 5, 1988).
71. Letter from Franklin G. Stearns, Brown, Rudnick, Freed & Gesmer (Attorney for New England Plastics Corporation) to Mark Stein, EPA Region I (November 3, 1988). Concerning confirmation of scheduled contracting work to connect wastewater discharge to the MWRA sewer system for the week of November 14, 1988.

NORTHERN RESEARCH & ENGINEERING CORPORATION

72. Request for Information from P. Keough, EPA Region I to K. Ginwall, Northern Research & Engineering Corporation (June 10, 1983).
73. Answers to EPA Request for Information, Northern Research & Engineering Corporation (June 24, 1983).
74. Letter from Merrill Hohman, EPA Region I to Northern Research and Engineering Corporation (February 3, 1989). Concerning Notice of Potential Liability.

NUNES BROTHERS TRUCKING COMPANY

75. Request for Information from M. Hohman, EPA Region I to Nunes Trucking Company (July 22, 1987).
76. Answers to EPA Request for Information, Nunes Brothers Trucking Company and Warehouse (September 3, 1987).

OLYMPIA NOMINEE TRUST

77. Request for Information from EPA Region I to G. Whitten, C. Whitten, A. Whitten, Olympia Nominee Trust (July 22, 1987).
78. Answers to EPA Request for Information, Olympia Nominee Trust (September 11, 1987).
79. Notice of Potential Liability from EPA Region I to Olympia Nominee Trust (April 20, 1988).
80. Letter from Merrill Hohman, EPA Region I to George Whitten (c/o Lou Massery, Esq., Cooley, Manion, Moore & Jones) (February 3, 1989). Concerning Notice of Potential Liability.

PIHER CORPORATION

81. Request for Information from L. Sutton, EPA Region I to Piher Corporation (May 10, 1983).
82. Answers to EPA Request for Information, Piher Corporation (June 7, 1983).

POWER PRODUCTS INC.

83. Request for Information from L. Sutton, EPA Region I to Power Products Inc. (May 10, 1983).
84. Answers to EPA Request for Information, Power Products Inc. (June 27, 1983).

PROSPECT TOOL AND DIE COMPANY, INC.

85. Letter from W.T. Grandin, Massachusetts Metropolitan District Commission to R. Benger, Prospect Tool & Die Company, Inc. (December 10, 1981).
86. Request for Information from M. Hohman, EPA Region I to Prospect Tool and Die Company, Inc. (July 22, 1987).
87. Answers to EPA Request for Information, Prospect Tool & Die Company, Inc. (August 27, 1987).
88. Notice of Potential Liability from EPA Region I to Prospect Tool and Die Company, Inc. (April 20, 1988).

11.9 PRP-Specific Correspondence (cont'd)

SALADA TEA

89. Request for Information from L. Sutton, EPA Region I to Salada Tea (May 10, 1983).
90. Answers to EPA Request for Information, Salada Tea (August 19, 1983).

THOMAS E. HOGAN, INC.

91. Request for Information from L. Sutton, EPA Region I to Thomas E. Hogan, Inc. (May 10, 1983).
92. Answers to EPA Request for Information, Thomas E. Hogan, Inc. (June 15, 1983).

UNIFIRST CORPORATION

93. Request for Information from M. Hohman, EPA Region I to A. Croatti, UniFirst Corporation (January 29, 1987).
94. Answers to EPA Request for Information, UniFirst Corporation (February 19, 1987).
95. Answers to EPA Request for Information, UniFirst Corporation (supplement) (February 25, 1987).
96. Memo from B. Newman, EPA Region I to R. Cavagnero, D. Lang, L. Evans, & D. Delaney, EPA Region I (April 22, 1987).
97. Set of EPA Region I Telephone Notes, B. Newman, EPA Region I/J. Lawson, Environmental Research & Technology, Inc. (regarding Unifirst Corporation) (May 26, 1987).
98. Set of EPA Region I Telephone Notes, B. Newman, EPA Region I/J. Lawson, Environmental Research & Technology, Inc. (regarding Unifirst Corporation) (June 1, 1987).
99. Letter from J.T. Lawson, Environmental Research & Technology, Inc. to D. Delaney, EPA Region I (regarding Unifirst Corporation) (June 26,1987).
100. Set of EPA Region I Meeting Notes, B. Newman, EPA Region I, Unifirst Corporation (July 7,1987).
101. Letter from J.T. Lawson, Environmental Research & Technology, Inc. to B. Newman, EPA Region I (regarding Unifirst Corporation) (November 16, 1987).
102. Set of EPA Region I Telephone Notes, B. Newman EPA Region I/J. Lawson, Environmental Research & Technology, Inc. (regarding Unifirst Corporation) (December 11, 1987).
103. Letter from Gretchen Muench, EPA Region I to Jeffrey C. Bates, Goodwin, Procter & Hoar (Attorney for UniFirst Corporation) (December 31, 1987). Concerning follow-up to recent conversation and letter from ERT dated December 21, 1987.
104. Set of EPA Region I Telephone Notes, B. Newman EPA Region I/J. Lawson, Environmental Research & Technology, Inc. (regarding Unifirst Corporation) (January 21, 1988).
105. Letter from J.T. Lawson, Environmental Research & Technology, Inc. to B. Newman, EPA Region I (regarding Unifirst Corporation) (January 28, 1988).

11.9 PRP-Specific Correspondence (cont'd)

UNIFIRST CORPORATION (cont'd)

106. Letter from J.T. Lawson, Environmental Research & Technology, Inc. to J. Bridge, GeoTrans (regarding Unifirst Corporation) (January 29, 1988).
107. Request for Information from M. Hohman, EPA Region I to A. Croatti, Unifirst Corporation (February 22, 1988).
108. Letter from J.H. Guswa, GeoTrans to J.T. Lawson, Environmental Research & Technology, Inc. (regarding Unifirst Corporation) (February 25, 1988).
109. Letter from J.T. Lawson, Environmental Research & Technology, Inc. to B. Newman, EPA Region I (regarding Unifirst Corporation) (March 16, 1988).
110. Letter from Nancer Ballard, Goodwin, Procter & Hoar (Attorney for Aldo Croatti Family Partnership/UniFirst Corporation) to Gretchen Muench, EPA Region I (March 17, 1988). Concerning confirmation of two week extension from EPA on request for information from Aldo Croatti Family Partnership/UniFirst Corporation.
111. Letter from L.M. Hogan, Environmental Research & Technology Inc. to B. Newman, EPA Region I (transmittal of Soil Analysis Report from Unifirst Corporation) (March 22, 1988).
112. Answers to EPA Request for Information from R. Croatti, Unifirst Corporation to B. Newman, EPA Region I (April 11, 1988).
113. Notice of Potential Liability from EPA Region I to Croatti Family Partnership (April 20, 1988).
114. Notice of Potential Liability from EPA Region I to Unifirst Corporation (April 20, 1988).
115. Letter from J. Bates, Goodwin, Procter & Hoar to G. Muench, EPA Region I (transmittal of comments on the Agency for Toxic Substances and Disease Registry's draft toxicological profile for tetrachloroethylene) (July 6, 1988).

UNITED TRUCK LEASING CORPORATION

116. Request for Information from M. Hohman, EPA Region I to R. Abrams, United Truck Leasing Corporation (July 22, 1987).
117. Answers to EPA Request for Information, United Truck Leasing Corporation (August 7, 1987).

W.R. GRACE & COMPANY

118. Request for Information from L. Carothers, EPA Region I to V.A. Forte, W.R. Grace & Company (January 15, 1982).
119. Answers to EPA Request for Information, W.R. Grace & Company (February 5, 1982).
120. Answers to EPA Request for Information, W.R. Grace & Company (January 21, 1986).
121. Set of EPA Region I Meeting Notes, W.R. Grace & Company Meeting (September 14, 1987).
122. EPA Region I Attendance List, W.R. Grace & Company Pump Test Meeting (February 24, 1988).

11.9 PRP-Specific Correspondence (cont'd)

W.R. GRACE & COMPANY (cont'd)

123. Set of EPA Region I Meeting Notes, W.R. Grace & Company Pump Test Meeting (February 24, 1988).
124. Notice of Potential Liability from EPA Region I to W.R. Grace & Company, Incorporated (April 20, 1988).
125. Letter from J.A. Cherry and J.H. Guswa, GeoTrans to B. Newman, EPA Region I (regarding W.R. Grace & Company and Unifirst Corporation) (June 24, 1988).
126. Letter from M. Stoler, W.R. Grace & Company to B. Newman, EPA Region I (includes comments on the Agency for Toxic Substances and Disease Registry (ATSDR) toxicological profile for trichloroethylene) (June 27,1988).

WATERBED WAREHOUSE/WATERREST PRODUCTS

127. Request for Information from EPA Region I to Waterbed Warehouse (May 10, 1983).
128. Answers to EPA Request for Information, Waterrest Products, Inc. (May 25, 1983).

WEDEL CORPORATION

129. Request for Information from M. Hohman, EPA Region I to J. Riley, Wedel Corporation (March 24,1988).
130. Letter from Mary K. Ryan, Nutter, McClennan & Fish (Attorney for Wedel Corporation and Riley Leather Company) to Gretchen Muench, EPA Region I (April 21, 1988). Concerning extension of response time to May 6, 1988 for EPA's most recent information request.
131. Answers to EPA Request for Information, Wedel Corporation and Riley Leather Company (May 6, 1988).
132. Letter from M. Gretchen Muench, EPA Region I to Mary Ryan, Nutter, McClennan and Fish (Attorney for Wildwood Conservation Corporation, Riley Leather Company, Incorporated and Wedel Corporation) (January 5, 1989). Concerning Riley Leather Company, Incorporated's plans to cease operation and EPA's need to continue production well operations.

WEYERHAEUSER COMPANY

133. Letter from EPA Region I to Weyerhaeuser Company (July 31, 1987).
134. Answers to EPA Request for Information, Weyerhaeuser Company (September 15, 1987). NOTE: Oversize "Plan of Land" is available for review at the EPA Region I, Boston, Massachusetts.

WHITNEY BARREL COMPANY

135. Answers to EPA Request for Information, Whitney Barrel Company (February 16, 1988).
136. Letter from Merrill Hohman, EPA Region I to Ruth Whitney, Whitney Barrel Company, Incorporated (February 3, 1989). Concerning Notice of Potential Liability.

11.9 PRP-Specific Correspondence (cont'd)

WILDWOOD CONSERVATION CORPORATION

137. Request for Information from M. Hohman, EPA Region I to J. Riley, Wildwood Conservation Corporation (September 17, 1987).
138. Answers to EPA Request for Information, Wildwood Conservation Corporation (October 5, 1987).
139. Answers to EPA Request for Information, Wildwood Conservation Corporation and John J. Riley Company, Inc. (November 11, 1987).
140. Answers to EPA Request for Information, Wildwood Conservation Corporation (November 20, 1987).
141. Answers to EPA Request for Information, Wildwood Conservation Corporation (November 23, 1987).
142. Notice of Potential Liability from EPA Region I to Wildwood Conservation Corporation (April 20, 1988).

WOBURN, City of

143. Letter from Merrill Hohman, EPA Region I to Mayor John Rabbitt, City of Woburn (February 3, 1989). Concerning Notice of Potential Liability.

WOBURN ASSOCIATES

144. Letter from Merrill Hohman, EPA Region I to Woburn Associates, Incorporated (February 3, 1989). Concerning Notice of Potential Liability.

WOBURN FOREIGN MOTORS

145. Letter from EPA Region I to Woburn Foreign Motors (May 10, 1983).
146. Answers to EPA Request for Information, Woburn Foreign Motors (June 16, 1983).

11.10 PRP-Specific Evidence-Government Agency Documents

1. "Industrial User Permit Application" Form, Metropolitan District Commission (completed by New England Plastics Corporation) (December 17, 1981).
2. "General Information" Form (Consolidated Permits Program), US EPA (completed by New England Plastics Corporation) (January 28, 1987).
3. "Application for Permit to Discharge Wastewater" Form, US EPA (Completed by New England Plastics Corporation) (February 23, 1987).

11.11 PRP-Specific Evidence

1. Certificate of Laboratory Analysis, Camp, Dresser & McKee, Inc. (August 12, 1986).
2. Certificate of Laboratory Analysis, Camp, Dresser & McKee (January 2, 1987).

11.14 Title Searches

1. "Wells G & H Title Searches Woburn, MA Final Site Report," Planning Research Corporation (February 1987). NOTE: Oversize "Site Parcel Boundary Map" available for review at the EPA Boston, Massachusetts.

11.16 Scopes of Work

1. Letter from J.T. Lawson, Environmental Research & Technology, Inc. to D. Delaney, EPA Region I (February 10, 1987). Concerning Unifirst Corporation.
2. Letter from J.T. Lawson, Environmental Research & Technology, Inc. to B. Newman, EPA Region I (January 7, 1988). Concerning aquifer test means and objectives, Unifirst Corporation site.
3. Letter from J.H. Guswa, GeoTrans to B. Newman, EPA Region I (February 8, 1988). Concerning W.R. Grace & Company pumping tests.

13.0 COMMUNITY RELATIONS

13.1 Correspondence

1. Letter from G. Latowsky, For A Cleaner Environment to Barbara Newman, EPA Region I (May 31, 1988). Concerning release of the Feasibility Study.
2. Letter from Mary Kay Voytilla, EPA Region I to Felix Glovasky, Woburn Resident (June 29, 1989). Concerning the results of the indoor air survey conducted by EPA during the week of April 24, 1989.
3. Letter from Mary Kay Voytilla, EPA Region I to Paul Medeiros, Woburn Resident (June 29, 1989). Concerning the results of the indoor air survey conducted by EPA during the week of April 24, 1989.
4. Letter from Mary Kay Voytilla, EPA Region I to John and Sophie Morrison, Woburn Residents (June 29, 1989). Concerning the results of the indoor air survey conducted by EPA during the week of April 24, 1989.
5. Letter from Mary Kay Voytilla, EPA Region I to Felix Glovasky, Woburn Resident (August 1, 1989). Concerning the transmittal of EPA's findings from the "Residential Indoor Air Sampling Report" of June 1989.
6. Letter from Mary Kay Voytilla, EPA Region I to Paul Medeiros, Woburn Resident (August 1, 1989). Concerning the transmittal of EPA's findings from the "Residential Indoor Air Sampling Report" of June 1989.

13.1 Correspondence (cont'd)

7. Letter from Mary Kay Voytilla, EPA Region I to John and Sophie Morrison, Woburn Residents (August 1, 1989). Concerning the transmittal of EPA's findings from the "Residential Indoor Air Sampling Report" of June 1989.

13.2 Community Relations Plan

1. Letter from P.A. Brady, Woburn Conservation Commission to D. Prybyla, EPA Region I (December 13, 1985). Concerning comments on the Draft Community Relations Plan.
2. Letter from G. Latowsky, For A Cleaner Environment to D. Prybyla, EPA Region I (January 21, 1986). Concerning comments on the Draft Community Relations Plan.
3. "Community Relations Plan," NUS Corporation (April 1986).

13.3 News Clippings/Press Releases

1. Press Release Issued by EPA Region I (November 7, 1984).
2. Press Release Issued by EPA Region I (February 10, 1986).
3. Press Release Issued by EPA Region I (October 1986).
4. Press Release Issued by EPA Region I (February 18, 1987).
5. Press Release Issued by EPA Region I (October 1, 1987).
6. News clipping announcing the availability of the Administrative Record for Public Review, Woburn Daily Times Chronicle - Woburn, Massachusetts (October 12, 1988).
7. "Environmental News," Concerning EPA's announcement of the release of the Supplemental Remedial Investigation (RI) and the Endangerment Assessment, EPA Region I (December 14, 1988).
8. "Environmental News," Concerning EPA's announcement of the Proposed Cleanup Plan, EPA Region I (February 1, 1989).
9. "The United States Environmental Protection Agency Invites Public Comment on the Feasibility Study and Proposed Plan for the Wells G & H Superfund Site in Woburn, Massachusetts," Daily Times Chronicle (February 2, 1989).
10. EPA Environmental News - "EPA Testing Air In Homes Near Wells G & H Site," EPA Region I (April 26, 1989).
11. Public Notice - "Woburn Residential Survey Questionnaire Wells G & H Superfund Site," EPA Region I (April 1989). [Cross-Reference: Completed Residential Survey Questionnaires may be found in Appendix A of the report entitled "Residential Indoor Air Sampling Results, Wells G & H Superfund Site Woburn, Massachusetts." Filed and cited as entry number 9 in 3.2 Sampling and Analysis Data.]
12. Press Release - "EPA Finds No Health Threat From Indoor Air at Homes Near Wells G & H Site," EPA Region I (August 25, 1989).

13.4 Public Meetings

1. Transcript, Public Hearing on Studies Re: *Wells G & H Superfund Site, Woburn, Massachusetts* (February 27, 1989).

13.5 Fact Sheets

1. EPA Region I Fact Sheet (March 1986).
2. EPA Region I Fact Sheet (November 1986).
3. EPA Region I Fact Sheet (October 1987).
4. EPA Region I Fact Sheet (May 1988).
5. "Superfund Program Fact Sheet," EPA Region I (December 1988).

16.0 NATURAL RESOURCE TRUSTEE

16.1 Correspondence

1. Letter from Barbara Newman, EPA Region I to Ken Carr, U.S. Department of the Interior, Fish and Wildlife Service (December 5, 1988). Concerning request that DOI determine if a Covenant Not to Sue for Natural Resources Damages should be evaluated in any possible settlement.
2. Letter from Barbara Newman, EPA Region I to Ken Finkelstein, National Oceanic and Atmospheric Administration (December 5, 1988). Concerning request that NOAA determine if a Covenant Not to Sue for Natural Resources Damages should be evaluated in any possible settlement.

16.3 Natural Resource Trustee Release

1. Letter from William Patterson, U.S. Department of the Interior, Office of Environmental Project Review to Barbara Newman, EPA Region I (December 23, 1988). Concerning a Covenant Not to Sue on the Wells G & H site.
2. Letter from Bruce Blanchard, U.S. Department of the Interior, Office of Environmental Project Review to Gene Lucero, USEPA, Headquarters. Concerning request that DOI determine whether any resources under its trusteeship are or have been affected by hazardous substances releases from the Wells G & H site.

17.0 SITE MANAGEMENT RECORDS

17.7 Reference Documents

1. U.S. Environmental Protection Agency, Office of Water, Application of Interim Sediment Criteria Values at Sullivan's Ledge Superfund Site (April 11, 1988).

17.8 State and Local Technical Records

1. Set of Well Sampling Data, Lawrence Experiment Station Massachusetts Department of Public Health Woburn (November 1, 1963 through March 2, 1964).
2. "Contract for Constructing Gravel Packed Wells, Etc.," Whitman & Howard, Inc., Engineers (May 1964).
3. "Report in Relation to Test Well Work East Woburn Area," Whitman & Howard, Inc., Engineers (May 1964).
4. Letter from L. M. Pittendreigh, Whitman & Howard, Inc., Engineers to E. F. Gill, Mayor of Woburn (May 19, 1964).
5. Pumping Test Report, Whitman and Howard, Consulting Engineers (July 13, 1964).
6. Letter from D. M. Erickson, Layne New England Company to T. J. Mernin, City of Woburn (February 28, 1977). Concerning Emergency Overhaul of H Well.
7. Letter from G.R. Allan, Dufresne-Henry Engineering Corporation to Water Study Committee, City Council, Town of Woburn (March 29, 1977). Concerning Progress Report "G" Well.
8. "Report on East Side Water Problem Wells G & H," Dufresne-Henry Engineering Corporation (January 1978).
9. "Final Report in Relation to East Side Wells," Dufresne-Henry Engineering Corporation (via transmittal letter from L. Pittenreigh, Dufresne-Henry Engineering Corporation to A. Wall, City of Woburn) (January 26, 1978).
10. "Report of Overhaul "G" Well March 1978," American Artesian Well Company (March 1978).
11. Internal City of Woburn Letter from T. Mernin to B. Cleaver (February 15, 1980). Concerning map and pumping schedule.
12. Internal City of Woburn Letter from T. Mernin to B. Cleaver (February 25, 1980).
13. Memorandum from Brian Kelleher, Massachusetts Department of Environmental Quality Engineering to File (May 13, 1980). Concerning meeting with representatives of John Riley Company.
14. Letter from P. Brady, Woburn Conservation Commission to J. Riley, Riley Leather Company (June 4, 1980).
15. Letter from J.E. Pellerin, Massachusetts Department of Environmental Quality Engineering to Raymond Donlan (June 27, 1980). Concerning Atlantic Gelatin Sample Analysis.

17.8 State and Local Technical Records (cont'd)

16. "Report: Woburn Atlantic Gelatin, Division of General Foods, Water Supply Survey, Cross Connection Survey," David Erekson, Jr. Sanitary Engineer (August 7, 1980).
17. Letter from R. Slein, Massachusetts Department of Environmental Quality Engineering to John J. Riley Company (August 29, 1980).
18. Special Analysis, Department of Environmental Quality Engineering (September 22, 1980).
19. Set of Well Sampling Data, Massachusetts Department of Environmental Quality Engineering (September 25, 1980).
20. "Metropolitan District Commission Septage Receiving Station Report," GTE Laboratories (October 3, 1980).
21. Letter From S.M. Lord, Massachusetts Division of Water Pollution Control to Beatrice Food (October 10, 1980).
22. Letter from W.J. St. Hilaire, Massachusetts Department of Environmental Quality Engineering to J.J. Riley, Jr., John J. Riley Company (October 15, 1980).
23. Letter from President of New York Urban Servicing Company, Inc. to S.M. Lord, Massachusetts Division of Water Pollution Control (October 23, 1980).
24. Letter from W.T. Grandin, Metropolitan District Commission to L. Fucarile, Ecology and Environment, Inc. (November 26, 1980).
25. Memorandum from M. Snow, Massachusetts Department of Environmental Quality Engineering to A. Ferullo, MDC, H. Brown, DHW, B. Cleary, DAQC, G. McCall, Water Supply, R. Leighton, EPA, P. Hogan, DWPC. (Regarding Maps of the Mystic River Watershed) (December 30, 1980).
26. Memorandum from Brian Kelleher, Massachusetts Department of Environmental Quality Engineering to Sabin Lord and Vic Karaian, Massachusetts Department of Water Pollution Control (February 11, 1981). Concerning authority of State Department of Water Pollution Control to regulate onsite disposal of tannery sludges.
27. Memorandum from J.M. Jannetti, Massachusetts Department of Environmental Quality Engineering to W. Cashins, Massachusetts Division of Water Pollution Control (June 24, 1981).
28. Letter from R. Chalpin, Massachusetts Department of Environmental Quality Engineering to D. Portius, EPA Region I (August 23, 1982).
29. "Gas Chromatography-Mass Spectrometry Analysis of Purgeable Organics," Massachusetts Department of Environmental Quality Engineering (September 3, 1982).
30. Internal Massachusetts Department of Environmental Quality Engineering Memorandum from R. Cleary/H. Waldorf to File (September 17, 1982).
31. Notes to File, Robert Cleary, Massachusetts Department of Environmental Quality Engineering (December 10, 1982). Concerning inspections at Cummings Office Park Tower.

17.8 State and Local Technical Records (cont'd)

32. Letter from H. Waldorf, Massachusetts Department of Environmental Quality Engineering to K. Marschner, New Hampshire Bureau of Hazardous Waste Management (January 19, 1983).
33. Massachusetts Department of Environmental Quality Engineering Inspection - Trip Summary Sheet (April 6, 1983). Concerning inspection of John J. Riley Company.
34. Letter from J.W. Rabbitt, Mayor of Woburn to M. Hohman, EPA Region I (February 20,1986).
35. Letter from D.F. Mahoney, Woburn Board of Health to J.E. Whitney, Whitney Barrell Company (February 25, 1986).
36. Letter from R. Chalpin, Massachusetts Department of Environmental Quality Engineering to G. Weyerhaeuser, Weyerhaeuser Corporation (June 24, 1986). Concerning Groundwater Contamination Notice Of Responsibility Pursuant To M.G.L. Chapter 21E.
37. Letter from R. Chalpin, Massachusetts Department of Environmental Quality Engineering to D.C. Nicholson, Weyerhaeuser Company (August 17, 1986). Concerning groundwater contamination.
38. "Supplemental Information for Test Boring Logs," Wehran Engineering Consulting Engineers (January 28,1987).
39. Letter from W. Kingston, Juniper Development to R. DeRice, Massachusetts Department of Environmental Quality Engineering (transmittal of "Groundwater Sampling and Analysis Report," Goldberg-Zoino & Associates, Inc., January 14, 1987) (April 1, 1987).
40. "Site Investigation Report for the Weyerhaeuser Site," Wehran Engineering Corporation for the Massachusetts Department of Environmental Quality Engineering (July 1987).
41. Letter from R. Chalpin, Massachusetts Department of Environmental Quality Engineering to J.E. Whitney, Whitney Barrel Company (July 8, 1987).
42. Letter from R. Chalpin, Massachusetts Department of Environmental Quality Engineering to D. Nicholson, Weyerhaeuser Company (September 11, 1987).
43. Letter from R. Chalpin, Massachusetts Department of Environmental Quality Engineering to Mrs. J.E. Whitney, Whitney Barrel Company (September 11, 1987).
44. "Site Investigation Whitney Barrel Site, Work and Cost Plan," E.C. Jordan Company (October 1987).
45. Letter from A. Desmarias, Jason. M Cortell Associates, Inc. to R. DeRice, Massachusetts Department of Environmental Quality Engineering (December 31, 1987). Concerning Scope of Work.

17.8 State and Local Technical Records (cont'd)

46. Memorandum from Christopher S. Zarba, USEPA to Jane Downing, EPA Region I (April 11, 1988). Concerning "Interim Sediment Criteria Values for Nonpolar Hydrophobic Organic Compounds."
47. Letter from R. Bois, Massachusetts Department of Environmental Quality Engineering to B. Newman, EPA Region I (April 13, 1988).
48. "Summary of Massachusetts Drinking Water Quality Monitoring Program," Massachusetts Department of Environmental Quality Engineering, Division of Water Supply (August 31, 1988).

19.0 RCRA RECORDS

19.1 Correspondence

1. Letter from S.M. Knight, CRYOVAC to EPA Region I (October 10, 1980). Concerning notification of hazardous waste activity.
2. Internal EPA Region I Memorandum from G.A. Lucero to M. Deland (September 15, 1983).

19.4 RCRA Facility Inspection Reports

1. "RCRA Inspection Checklist," US EPA (Regarding Atlantic Gelatin) (December 20, 1980).
2. "RCRA Inspection Checklist," US EPA (Regarding Interstate Uniform Services, Inc.).

19.6 Notification of Hazardous Waste Activity

1. "Acknowledgement of Notification of Hazardous Waste Activity", W.R. Grace & Company, Inc. (September 26, 1980).

SECTION II

GUIDANCE DOCUMENTS

GUIDANCE DOCUMENTS

EPA guidance documents may be reviewed at EPA Region I, Boston, Massachusetts.

General EPA Guidance Documents

1. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Community Relations in Superfund: A Handbook (Interim Version) (EPA/HW-6), September 1983.

2. U.S. Environmental Protection Agency. Office of Ground-Water Protection. Groundwater Protection Strategy, August 1984.

3. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Guidance on Remedial Investigations Under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) (EPA/540/G-85/002), June 1985.

4. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Guidance on Feasibility Studies Under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) (EPA/540/G-85/003), June 1985.

5. Memorandum from Gene Lucero to EPA (August 28, 1985) (discussing community relations at Superfund Enforcement sites).

6. National Oil and Hazardous Substances Pollution Contingency Plan, Code of Federal Regulations (Title 40, Part 300), 1985.

7. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Draft Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites (OSWER Directive 9283.1-2), September 20, 1986.

8. Comprehensive Environmental Response, Compensation, and Liability Act of 1980, amended October 17, 1986.

9. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Superfund Public Health Evaluation Manual (OSWER Directive 9285.4-1), October 1986.

10. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Interim Guidance on Superfund Selection of Remedy (OSWER Directive 9355.0-19), December 24, 1986.

General EPA Guidance Documents (cont'd)

11. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Data Quality Objectives for Remedial Response Objectives (EPA/540/G-87/003), March 1987.

12. Letter from Lee M. Thomas to James J. Florio, Chairman, Subcommittee on Consumer Protection and Competitiveness, Committee on Energy and Commerce, House of Representatives (May 21,1987) (discussing EPA's implementation of the Superfund Amendments and Reauthorization Act of 1986).

13. Memorandum from J. Winston Porter to Addressees ("Regional Administrators, Regions I-X; Regional Counsel, Regions I-X; Director, Waste Management Division, Regions I,IV,V,VII,and VIII; Director, Emergency and Remedial Response Division, Region II; Director, Hazardous Waste Management Division, Regions III and VI; Director, Toxics and Waste Management Division, Region IX; Director, Hazardous Waste Division, Region X; Environmental Services Division Directors, Region I, VI, and VII") (July 9, 1987) (discussing interim guidance on compliance with applicable or relevant and appropriate requirements).

14. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Additional Interim Guidance for Fiscal Year 1987 Record of Decisions (OSWER Directive 9355.0-21), July 24, 1987.

15. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Community Relations in Superfund: A Handbook (Interim Version) (EPA/540/G-88/002), June 1988.

16. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (EPA/540/C-89/004) (OSWER Directive 9355.3-01), October 1988.

WELLS G & H

APPENDIX C
STATE CONCURRENCE LETTER

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Quality Engineering
Bureau of Waste Site Cleanup
One Winter Street, Boston, Mass. 02108

Daniel S. Greenbaum
Commissioner

September 9, 1989

Paul Keough
Acting Regional Administrator
U.S. EPA
JFK Federal Building
Boston, MA 02203

RE: Woburn - Concurrence with ROD for Wells G&H Federal Superfund Site - Source Control Operable Unit #1

Dear Mr. Keough:

The Department of Environmental Protection (The Department), formerly the Department of Environmental Quality Engineering, has reviewed the preferred remedial action alternative recommended by EPA for source control measures at the Wells G&H federal Superfund site. The Department concurs with the selection of the preferred alternative for source control measures.

The Department has evaluated EPA's preferred alternative for consistency with M.G.L. Chapter 21E as amended in November 1988. The Department has determined that the preferred alternative, incineration and in-situ volatilization for contaminated soils and groundwater recovery and treatment at the source areas, is consistent with the overall permanency requirements of M.G.L. Chapter 21E. Chapter 21E encourages implementing remedies on portions of a site to address pressing hazards. A determination that a permanent solution will be achieved can not be made, however, until it has been demonstrated that a selected remedial measure or combination of measures will meet the Total Site Risk Limits as defined in the Massachusetts Contingency Plan for the entire Wells G&H site. This, of course, cannot occur until remedial measures are selected for all contaminated areas of the site.

The Department has reviewed the ARAR's identified for the Commonwealth and believes the proposed remedy will meet these. This will continue to be evaluated as remedial design progresses and during implementation and operation. In addition, we will continue to identify ARAR's during remedial alternative evaluation of subsequent operable units at the Wells G&H site.

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As stated in the ROD, the central area is to be addressed as a separate operable unit. The proposed plan released by EPA in February of this year included remedial measures for the central area as well as the source areas. Comments received from the public and potentially responsible parties questioned the feasibility of the preferred alternative for the central area resulting in its exclusion from this operable unit.

While the source control ROD calls for a study of the central area, the Department would like to reiterate its position, as fully set forth in its letter of September 1, 1989 to Ms. Voytilla, on the central area and the proposed study. It is the Department's position that the purpose of the study is to evaluate the feasibility of the remedial alternative originally called for in the proposed plan. If determined to be feasible, that remedy should be implemented. If it is determined that the preferred remedy is not feasible, then other technologies should be evaluated. In any case, the purpose of the study is not to determine whether remediation is warranted as that has already been established.

The Department looks forward to working with EPA in implementing the preferred alternative for source control and developing additional remedial measures for the remainder of the site. If you have any questions or require additional information please contact Jay Naparstek at 292-5697 or Rodene DeRice at 935-2160.

Very truly yours,

Daniel S. Greenbaum,
Commissioner
Department of Environmental
Protection

cc: Richard Chalpin, NERO
Nancy Preis, Dept. of the Attorney General